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THE IRON AGE

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▲▲▲ THE IRON AGE ▲▲▲

NOVEMBER 9, 1939

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Better Be Safe Than Sorry

BY this time, American industry has learned that it is not going to be swamped with war orders from the combatants abroad. The impetus that business in this country has received during the past eight weeks is merely a psychological "kick in the pants" that has gotten a should be energetic nation of go getters off of its dead center of aimless inaction.

There is enough unfilled demand and unspent money in America to keep us going at top speed for a number of years to come without looking abroad to capitalize on other peoples' distress. And the wise manufacturer here in the U.S.A. will make his plans accordingly.

The wise American manufacturer, or at least those that are north of the Mexican border and south of Canada, will not expand plant capacity in the expectation of future war orders even with the embargo repealed. Airplanes may be an exception, for this product is made by one of the few infant industries which have not reached maturity abroad.

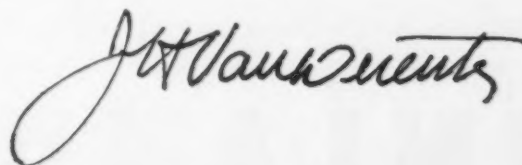
This advice to our friends is based on some cold and hard statistics that are entirely divorced from the influence of sentiment or ideology.

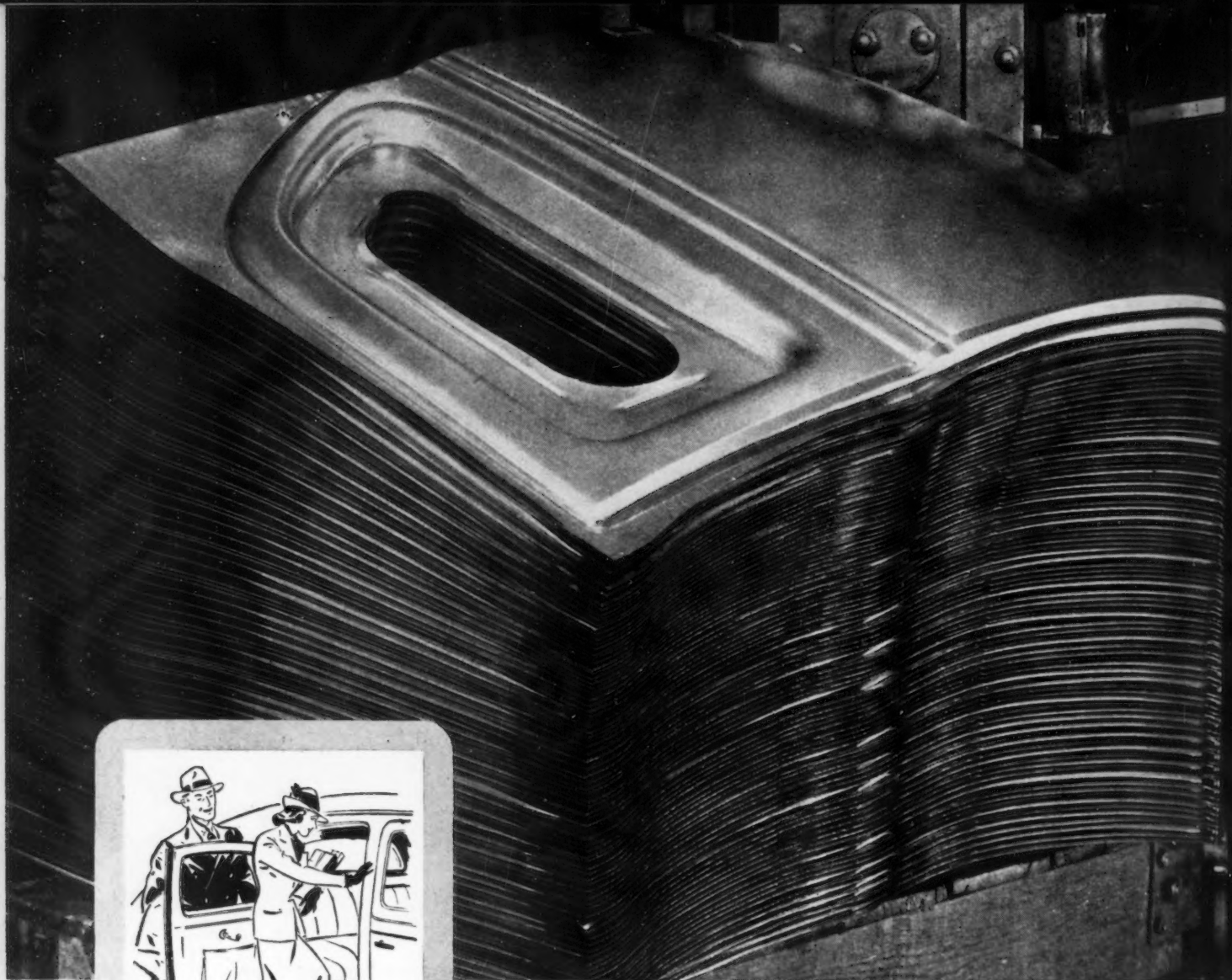
Fact number one is that Europe does not have the money to spend and, in view of past performance, cannot get the credit that it did in 1914. In 1914, London was the financial center of the world and the pound went to \$7. Today the U. S. is the financial center of the world and the pound, at \$4, is still slipping.

Fact number two is that in 1914 few nations abroad were able to produce their own requirements for war purposes. The Allies, particularly, needed many things that they could not produce and that we could. Since that time, these nations have become very largely self-sufficient in many of these items. What do you suppose the thousands upon thousands of modern American machine tools are doing that we have been shipping abroad for the past five years?

Fact number three is that during the past three years, the present combatant countries, which have been too poor to pay either principal or interest on the debts that they owe us, have been spending at the rate of \$20 billion per year for war preparation. That, as an eminent foreign statesmen recently said, leaves the Allies without much "cash to put on the barrelhead to buy Uncle Sam's products."

This is indeed a "cockeyed war" and the most cockeyed part of it, perhaps, is the expectation that we will profit from it. I will have to take that back, for on second thought it has already benefitted us. It has made us forget the New Deal and made the New Deal forget business. And that is probably the main reason for the upturn.





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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

RHODIUM PLATING

*properties,
applications,
plating practice
and costs*

By ADOLPH BREGMAN
Consulting Engineer, New York

EIGHTH in a Series of Articles on the Technical
and Economic Aspects of Metal Cleaning
and Finishing

UP to only a few years ago, rhodium was just another one of those rare, high-priced metals with few uses of any commercial importance. It was known to have some remarkable properties, but its cost stood in the way of its adoption for any but the most "fancy" applications. It was used in the 90-10 platinum-rhodium alloy as the important electrode in the Le Chatelier pyrometer; as catalytic contact material in the oxidation of ammonia to nitric acid (Ostwald process); for laboratory dishes and for windings in high temperature laboratory furnaces.

The discovery of a practical method of electroplating rhodium, however, changed the picture; the use of only a very thin coat made the cost of the

metal a small factor in the finished article. In a surprisingly short time after practical methods of depositing rhodium had become available, the use of these new techniques became widespread; first for jewelry and then for light reflectors, even though the price of rhodium rose steadily, from \$30 to \$40 per oz., several years ago to a present figure of \$125 per oz. These two fields are still the most important consumers of rhodium.

Properties and Applications

Rhodium has long been known as one of the inert ("noble") metals of the platinum group. Its melting point is about 1970 deg. C. (3578 deg. F.) and its specific gravity is 12.4. It has an attractive white color, similar to but even whiter than platinum, and can be given a high luster. It gives a very hard plate, 594 to 641 DPHN,

compared with 130 for silver, 155 to 420 for nickel and 500 to 900 for chromium¹. In the massive state it is not attacked by acids or mixtures of acids, even hot aqua regia. Its reflectivity is high, in some cases up to 80, compared with 65 for platinum and 100 for silver. It is permanently non-tarnishing at atmospheric temperatures. These properties have made it a standard material for the reflecting surface of light reflectors. Perhaps the best known installation is in the Radio City Music Hall, in New York. This installation consists of several thousand rhodium plated reflectors which have been in continuous service ever since 1931. Rhodium plate used for the metal reflectors in high powered moving picture projectors shows marked resistance to deterioration. It is easily wiped clean of the carbon particles sputtered from the arc.

Recently a method has been developed for depositing rhodium on glass, applicable particularly to front or first-surface mirrors.

For silverware, tableware and flatware, rhodium did not meet with the success originally hoped for. Although it had certain advantages, such as greater hardness and freedom from the tarnishing to which silver is liable,

¹R. H. Atkinson and A. R. Raper, *Journal of Electrodepositors' Technical Society* (London), Vol. 10, Sec. 1 (1933).

in practice, the slightly darker color of rhodium as compared with silver stood in its way for general acceptance by the consumer; and, in spite of its high hardness, scratching under the severe treatment in handling and washing could not be eliminated.

Rhodium plate has a number of other uses, but in much smaller volume. It has extended to scientific instruments, optical goods, pen points, art decorations, silver encrusted glassware and other special novelty items. Rhodium plated silver contacts have been found useful in telephone apparatus. In its largest field it is used mainly on rhinestone jewelry as the finish coat for white metal, or "jewelers' metal" (one of the Britannia alloys). It is most popular in the line retailing at \$1.00 or over, but it is also occasionally put on white gold and even platinum jewelry, for its attractive appearance.

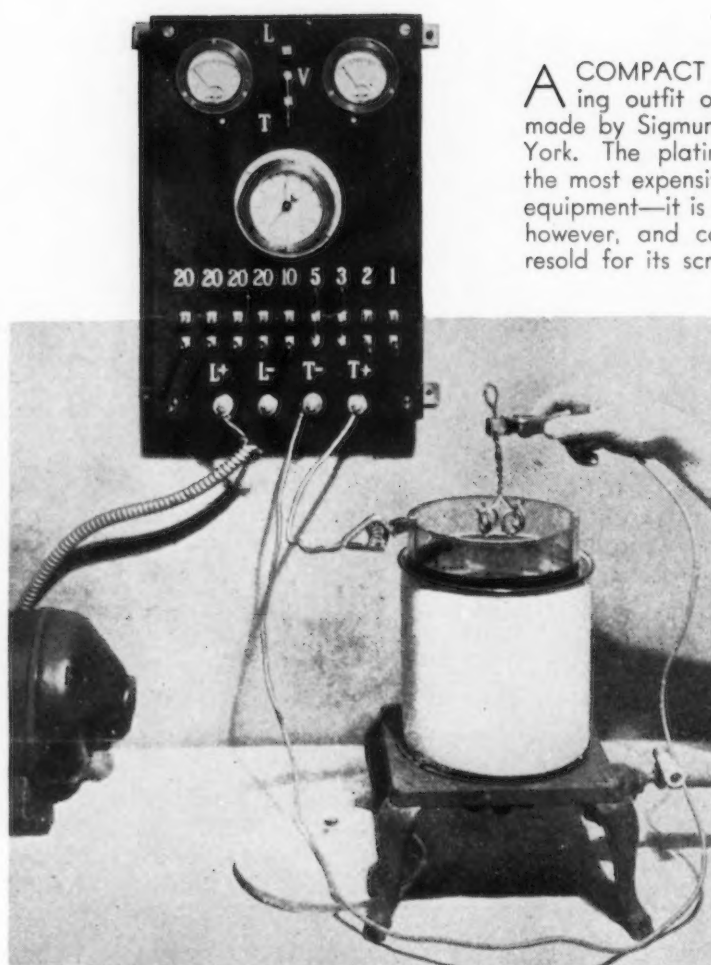
Plating Practice

Rhodium was first deposited in 1891 in connection with investigations of analytical methods. The first patent which involved its electrodeposition was issued in 1912, but it was not until after 1930 that the use of rhodium plate became general.

A list of the important patents² on rhodium plating as given by Schumpelt includes the following:

United States Nos. 1,779,435; 1,779,457; 1,901,531; 1,906,178; 1,906,179; 1,921,941; 1,970,950; 1,981,715; 1,981,820; 1,991,995; 1,993,623; 1,949,131; 1,947,180; 2,027,358; British patents Nos. 408,244; 440,938 and German patents Nos. 564,088 and 627,264.

At the present time the solutions used in commercial practice are of three types: (1) sulphate, (2) phosphate, (3) mixed sulphate and phosphate. These different compositions are covered by patents but they all contain about 2 gm. of rhodium per liter of solution. The sulphate type contains about 35 gm. of concentrated sulphuric acid per liter, and the phosphate type, from 10 to 40 cc. of 85 per cent phosphoric acid per liter of solution. They can be operated success-



A COMPACT rhodium plating outfit of this type is made by Sigmund Cohn, New York. The platinum anode is the most expensive item in the equipment—it is not consumed, however, and can always be resold for its scrap value.

fully at temperatures from 70 deg. F. to 140 deg. F. and at $2\frac{1}{2}$ to 5 volts (in some instances, up to 7 to 8 volts). The current density may vary over a wide range, from 10 to 100 amp. per sq. ft.

Opinions seem to differ on the advantages of the different types of solutions. Schumpelt² recommends a mixed sulphate and phosphate bath, with the metal in the form of a complex phosphate in a 2 per cent sulphuric acid solution, which, he states, will deposit a bright coat, approximately 0.0006 in. thick, at 20 amp. per sq. ft., in 30 min.

L. Cinamon³ prefers the phosphate bath on the ground that it may be operated at lower temperatures, gives whiter deposits and causes less skin irritations to the operator than the sulphate bath. The phosphate bath requires a higher voltage and conducting salts are not recommended as they adversely affect the color of the deposit. It has been stated that the corrosion resistance of rhodium deposited on tin-base alloys from the phosphate bath is higher than from the sulphate

bath, but Schumpelt disagrees with this claim², stating that the resistance and the life of the thin plate generally applied depend upon the quality of the nickel undercoating. Fink and Lambros⁴ recommend an ammonium sulphate solution, operated at 0.6 amp. per sq. in., at 50 deg. C. (122 deg. F.).

It is the general practice today to purchase prepared, concentrated solutions and to keep the bath up to strength by additions of these solutions. The bath should be operated in strict accordance with the instructions of the supplier.

Rhodium plating solutions are controlled primarily by testing for metal content. A simple test is by comparison of colors. A more accurate method is to use a colorimetric test set which, it is stated, is accurate within 0.1 gm. per liter⁵. The sulphate bath rarely needs replenishment in sulphuric acid since it is common practice to return the first rinse water to the bath to make up for evaporation. A reduction in acid content will become evident by the reduced conductivity of the

² Developments in the Electrodeposition of the Platinum Metals: Rhodium Plating, by K. Schumpelt, Proceedings of the First International Electrodeposition Conference, Journal of the Electrodepositors' Technical Society, 1937, Vol. 13, Sec. 24, pp. 3-6.

³ Monthly Review of the American Electro-Platers' Society, 1936, Vol. 23, p. 36.

⁴ Transactions Electrochemical Society, 1933, Preprint 63-11.

⁵ K. Schumpelt, Rhodium Solution, Metal Industry, February, 1939, p. 82.

bath, a drop in amperage at a definite voltage, the evolution of gas at the work and a darkening of the deposit. Replenishment by the concentrated rhodium solutions will make up for acid losses as they contain excess acid.

Platinum (insoluble) anodes are generally used, although in some instances, in the sulphate baths, lead anodes (also insoluble) may be employed; the advantage of the lead is, of course, the lower cost of the investment in anodes. However, in most instances platinum is recommended.

Extreme care is necessary in operating a rhodium solution. Foreign matter must be kept out at all costs, especially organic material, such as decayed wood (from exhaust flues), paper, etc. Instances have been reported where even the gelatin caps formerly used on reagent bottles contaminated the bath.

It is also a fact that a rhodium plating solution, which is no longer plating properly, is most difficult to readjust. In many instances, it is preferable to return this solution to the supplier for credit and to make up a new one.

The length of life of a rhodium solution is difficult to predict. With the proper care which any precious metal bath should receive, a rhodium bath should last for a very long time. In solutions in which the turnover of metal is very high compared with the volume of the bath, a gradual contamination through drag-over from cleaners and nickel solution is unavoidable. This results in a darker color of the deposit, and in this case a new solution should be made. Under normal use and with proper care, a rhodium bath should be good and give

consistent results for a year and longer. If a bath turns bad in a short time it is almost always traceable to some neglect or carelessness on the part of the operator. Protection from foreign materials is imperative.

It is well known that the plating of hollow articles is always a problem. Extremely careful washing and rinsing are necessary to avoid carrying over entrapped drag-out from the nickel plating solution into the rhodium bath, since such contamination will render it useless.

It is the almost unvarying commercial practice to deposit rhodium as a thin coat, approximately 1 mg. per sq. in., or 0.000005 in. thick, on a substantial undercoat of nickel. The rhodium coating has the same luster as the undercoat of nickel which is generally buffed or "colored" to the high finish desired. The hardness of rhodium makes polishing difficult. There is some variation in weight, of course, with the class of the article, ranging from a flash on cheap jewelry up to almost 0.0000075 in. on silverware, which, it is stated, will wear for some years. Heavy coatings are likely to be milky in color and also are liable to cracking.

Stripping rhodium plate is a difficult problem. Several stripping methods have been suggested but they usually attack the base metal severely so that refinishing becomes costly if not impossible.

Costs

In the cost of operating a rhodium plating solution, the first element is the metal itself which at the present price of rhodium, from \$170 to \$218 per oz. in solution form, amounts to about $\frac{1}{2}$ ¢. per sq. in. for a deposit of

1 mg. per sq. in. in weight. The cost of current is practically negligible, current densities varying from 0.1 to 1 amp. per sq. in., and in a large proportion of the work the parts stay in the tank for a very short time (15 sec. to 2 min.). The other cost item of importance, therefore, is labor, especially in the preparation of the work, which naturally varies with every different job plated.

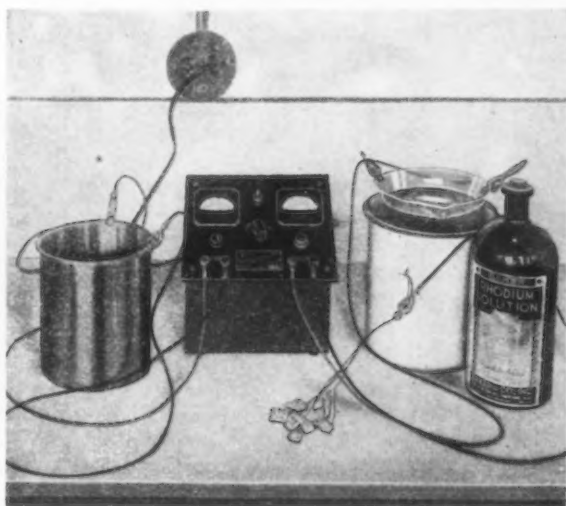
A factor of no small importance, however, which must not be overlooked is the depreciation of the bath itself. As stated above, a bath may run along nicely for a considerable length of time; it may also "go sour" overnight. Renewing this bath is generally not economical; consequently the cost of a new bath, less the credit for the return of the old one to the supplier, must be charged against the work done during its estimated probable life.

The cost of installation of a rhodium plating unit may be roughly estimated on the basis of a 6-gal. solution, as follows. The solution contains approximately 2 gm. of rhodium per liter, a total of about 45 gm. of metallic rhodium. At the present price of \$5.65 per gm. for this quantity, the cost of the solution is about \$255. The platinum anodes for a tank of this size are about 7x3 in., and weigh approximately 1 oz. and are worth about \$40 each. Using six anodes for the 6-gal. bath gives a cost of about \$240 for the anodes. A motor generator set ample for this unit would cost about \$200 including the control panel. To the above would have to be added the nickel solution, the electric cleaning solution (both very inexpensive), the containers, rinse tanks, rheostat, switches, meters, wiring, connections, etc., all of which could be covered by another \$100. This gives a total of about \$800 for a very substantial rhodium plating installation.

Those manufacturers interested in larger production than would be obtainable from such a unit would be well advised to work along the line of additional units rather than larger units, because of the greater flexibility and the lesser danger of having operations stopped by the one large solution going out of order.

The author acknowledges with thanks the aid of Adolph Cohn, of Sigmund Cohn, New York; G. B. Hogaboom, Jr., of G. B. Hogaboom, Jr. & Co., Newark, N. J.; and Dr. K. Schumpelt, of Baker & Co., Inc., Newark, N. J., in checking the data contained in this article.

THIS Baker & Co. rhodium plating outfit plugs into an ordinary service outlet. It is capable of handling plating baths from 1 liter to 1 gal.



PROPERTIES OF BRAZED

LAST week the author described how stainless steels could be brazed, with a resultant tensile strength of 140,000 lb. per sq. in. In this, the second section of a two-part article, the author sets forth the results of impact, shear and fatigue tests on the brazed joints, and explains the high tensile strength of the joints.

o o o

STANDARD impact test specimens with keyhole notches at the joints were machined from stainless steel specimens brazed with Cu-Ni-Fe. Some were tested in the as-brazed condition, or as they came from the cooling chamber; and some were heat treated, as previously stated, by heating to 950 deg. C. (1742 deg. F.), rapidly cooling, reheating to 650 deg. C. (1202 deg. F.), and then pushing them into the cooling chamber. The results of these tests are given in Table VI, below:

TABLE VI	
As Brazed	
Sample No.	Impact, In Ft.-Lb.
60	1.75
60	0.99
60	0.99
60	1.36
61	0.99
61	0.99
61	0.99
61	0.99
Heat Treated	
74	3.8
75	1.4
79	1.8
88	1.4

Four samples were machined from one brazed specimen in the case of those tested in the as-brazed condition, while only one sample was machined from each specimen in the case of those heat treated.

It can be seen that the average impact value of the heat treated samples is considerably higher than that for those tested in the as-brazed condition, but both are low.

V-Joint Tensile Bars

In order to determine the effect of the shape of the joints on the tensile properties where a combination of the forces of shear and tension come into

play, short tensile specimens were machined so that there was a male and female part. The planes of the faces forming the V-notch made 45-deg. angles with a plane passed through the longitudinal axis of the test specimen, and the line of contact between the male and female part at the bottom of the notch coincided with the diameter of the test specimen. A sketch of the test specimen is shown in Fig. 4.

In this case the three brazing materials Cu, Cu-Ni-Fe, and Co-Cu were used. The results of these tensile tests are given in Table VII.

Flat samples, 2x1x3/8 in., brazed with Cu, Cu-Ni-Fe, and Co-Cu so that they overlapped 1 in., giving a 1 sq. in. area of brazed surface, required about the same stress, 31,000 lb. per sq. in., to rupture them.

The behavior of fatigue test specimens brazed with Cu-Ni-Fe and machined so that the joint coincided with the smallest diameter of the sample is recorded in Table VIII. A sketch

of the test specimen is shown in Fig. 5.

If these brazed samples be considered as ferrous material, it would seem that the fatigue endurance limit is about 20,000 lb. per sq. in., and the ratio of the fatigue strength of the sample to the ultimate strength of the chrome steel is low. If the specimen be considered as non-ferrous, the data are incomplete, for the tests have not run the required 100,000,000 cycles.

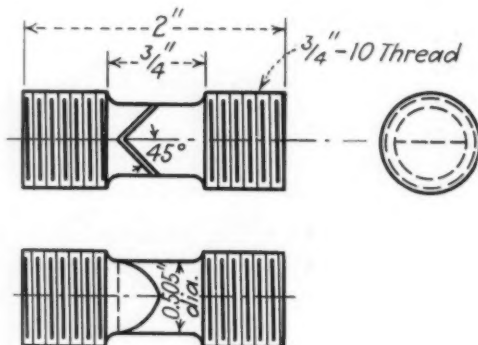
The results of physical tests, other than tensile, on 12 per cent chrome steel brazed with 85Cu-10Ni-5Fe were rather disappointing when compared with those for tensile properties. It seemed quite likely that the secret to the high strength might be in the brazing alloy itself, or a change in composition due to the alloying action of the brazing material with the chromium steel. It was decided to cast some 1 1/8-in. diameter rods which could be swaged and heat treated, and some to which 12 per cent chromium steel could also be added, and then determine the tensile strengths.

o o o

AT LEFT

FIG. 4 — Dimensions of brazed V-notch tensile test specimen.

o o o

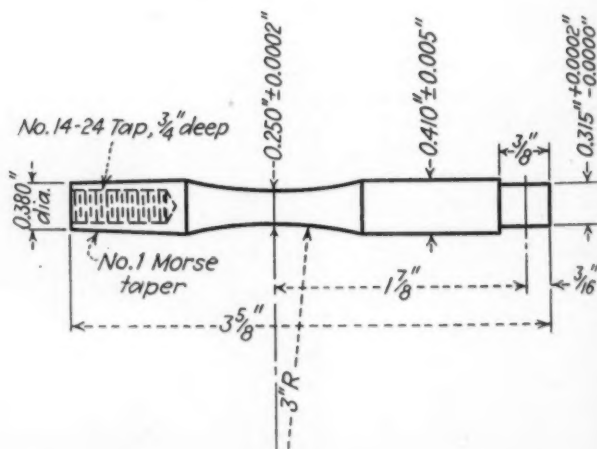


o o o

AT RIGHT

FIG. 5 — Small fatigue bars. The brazed joint coincides with the smallest diameter of the sample.

o o o



12% CHROME STEEL

By F. C. KELLEY
Research Laboratory, General
Electric Co.

The results of tensile tests, using the standard 0.505-in. diameter tensile test specimens of the 85Cu-10Ni-5Fe alloy, are given in Table IX.

The results of tests on the 85Cu-10Ni-5Fe brazing alloy to which varying amounts of 12 per cent chromium steel had been added are given in Table X.

It was quite evident from cold working and aging experiments that the brazing material could not be made to develop any such high strengths as we had found in the brazed 12 per cent chromium steel. The amount of age-hardening was found to be small after quenching and aging at many temperatures for various lengths of time. The greatest hardening was produced by cold work, but this is not a factor in the brazing of 12 per cent chrome steel.

The brazed joints of 12 per cent chromium steel specimens were so excellent when highly polished that it could scarcely be determined where they were. They were just visible to the naked eye when the light was reflected at the correct angle. The average width of one of these joints was 0.0008 in.

An unbrazed 12 per cent chromium steel sample which has gone through the brazing cycle, that is, heated to 1200 deg. C. (2192 deg F.) and pushed into the cooling chamber, will show very little elongation or reduction of area when broken under tension. The tensile strength will be about 200,000 lb. per sq. in. and the elongation in 2 in. may be 4 per cent. Such samples brazed with Cu-Ni-Fe will show an average tensile strength of about 131,000 lb. per sq. in.

The physical characteristics of the steel may be changed by heat treatment so that it shows an elastic limit and yield point. The strength of the brazed joint in this case will closely approach that of the steel. Such heat treatment does not produce the same degree of change in the brazing alloy; therefore, it seems reasonable to conclude that the high tensile properties found in the brazed steel depend to a greater extent upon the physical state of the steel than upon the physical properties of the brazing alloy where the thickness of the joints are of the order just mentioned.

The rupture of the joint in any case seems to depend upon a certain amount of movement in the steel. Some of the stress is probably translated into shear which causes it to break below the tensile strength of the steel. It is also quite evident that the atomic forces between the thin layer of brazing alloy and the steel exceed those in the brazing alloy itself by more than 100 per cent.

TABLE VII
Tensile Strengths of V-Shaped Joints

Sample No.	Brazing Material	Tensile Strength, In Lb. Per Sq. In.
49	Cu	40,070
50	Cu	40,020
51	Cu-Ni-Fe	32,500
52	Cu-Ni-Fe	47,200
53	Cu-Ni-Fe	43,500
54	3% Co-Cu	43,500
55	3% Co-Cu	42,450
56	3% Co-Cu	36,400

The author wishes to acknowledge the aid of Earl Parker for conducting the fatigue tests, members of our General Electric Works Laboratory who conducted the physical tests, and William Conant for the photomicrographs.

TABLE VIII
Results of Fatigue Tests on Brazed Joints

Stress	As Brazed Cycles	Remarks
50,000	3,000	Broke
30,000	6,000	Broke
30,000	7,000,000	Unbroken
30,000	142,000	Broke
20,000	1,762,000	Unbroken
20,000	11,590,000	Unbroken
20,000	681,000	Broke
Heat Treated 950 Deg. C., 650 Deg. C. Draw		
30,000	186,000	Broke
22,500	43,000	Broke
20,000	8,674,000	Unbroken

TABLE IX
Tensile Tests on Brazing Alloy

Sample No.	Treatment	Tensile Strength, In Lb. Per Sq. In.
1	As cast	43,200
2	As cast	42,900
A-1	Swaged from 1 1/8 in. to 0.800 in.	51,700
A-2	Swaged from 1 1/8 in. to 0.800 in.	51,900
B-1	Swaged from 1 1/8 in. to 0.800 in.	55,200
B-2	Swaged from 1 1/8 in. to 0.800 in.	55,700
A-3	Heated to 1000 Deg. C. and pushed into cooling chamber	47,400
A-4	Heated to 1000 Deg. C. and pushed into cooling chamber	44,700
B-3	Heated to 1000 Deg. C. and pushed into cooling chamber	47,700
B-4*	Heated to 1000 Deg. C. and pushed into cooling chamber	40,400
A	Swaged from 1 1/8 in. diameter to 1/2 in. diameter	62,400
A	Swaged from 1 1/8 in. diameter to 1/2 in. diameter	62,400
B	Swaged from 1 1/8 in. diameter to 1/2 in. diameter	62,900
B	Swaged from 1 1/8 in. diameter to 1/2 in. diameter	62,400
5	Swaged from 1 1/8 in. diameter to 0.800 in. diameter and annealed 1 hr. at 650 Deg. C.	48,700
6*	Swaged from 1 1/8 in. diameter to 1/2 in. diameter	40,200

Samples marked * contained voids.

TABLE X
Tensile Tests on Brazing Alloy Containing Varying Amounts of Chrome Steel

Sample No.	Per Cent Added Steel	Treatment	Tensile Strength, In. Lb. Per Sq. In.
1	2	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	58,700
2	5	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	59,500
3	7	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	57,300
4	10	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	56,300
5	15	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	57,500
6	20	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	55,900
7	25	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	60,300
8	30	Quenched in H ₂ O from 1000 Deg. C. and aged 5 hr. at 500 Deg. C.	60,100



GENERAL view of the Parrot Speed Fastener assembly line as seen from the delivery end at which there is a table for wrapping and boxing assembled machines. Assemblies in progress are advanced on the lower level of the belt and any which do not pass inspection are returned on the upper section of the belt to stations where necessary adjustments are made.

ASSEMBLING IN THE MODERN MANNER

By HERBERT CHASE

CONVENIENT, flexible and efficient are among the adjectives properly applied to the set-up for assembling paper stapling machines for office use, called Speed Fasteners, manufactured by the Parrot Speed Fastener Corp., Long Island City, N. Y. These small machines are built up from several stampings (most of which have been hardened and some plated), a die cast base and molded rubber feet and cap. Manufacture of the stamped parts was described in THE IRON AGE, issue of Aug. 24.

Assembling is done at the rate of about 3200 complete machines per 8-hr. day, which is a marked improvement over prior set-ups, although they were such as would be considered highly efficient in many plants. In the new lay-out, assembly is effected at some

48 stations arranged along a 2-ft. wide belt conveyor having a variable-speed drive but normally running at about 5 to 6 ft per min. At the end of the line, machines are delivered, completely inspected, tested and run-in, onto a bench in which they are packed in individual boxes and then in cartons containing three dozen machines, ready for shipment.

Although this assembly lay-out was designed especially for the job described, it could be adapted readily to almost any light assembly of small parts, and is made flexible so as to be changed over quickly when a run of one model is completed and another model is to be put through. Such changes in fixtures and light machines as are needed in assembly are then quickly made and the line is ready to

proceed with a minimum of delay. This can be done because the lay-out is designed carefully to make it flexible. Units not needed are detached as a whole and stored for future use and benches not required are folded out of the way to make space for a different arrangement of machines needed for assembly purposes.

The complete assembly lay-out occupies a space about 80 ft. long and 7 ft. wide, exclusive of aisle space, some of which is used for tote boxes containing fabricated parts ready for assembly. In the center is an angle iron frame carrying the supports and pulleys for the endless belt and its driving mechanism, all of which are within the frame, as are also a series of receptacles for plugging in motor driven tools on lines carrying respectively 120 volts single-phase and 220 volts three-phase current. These outlets are spaced on 3-ft. centers.

Nearly all assembly is done on individual benches 18x22 in. and spaced on 3-ft. centers, leaving 18 in. between for the operator. The benches are at a convenient height for seated opera-

tors and are placed at each side of the belt conveyor with one end hinged to and supported by the conveyor frame. Each bench has also a substantial but detachable metal leg to support the outer end and this is connected to the conveyor frame by a foot rest bar a few inches above the floor. Tops are of wood, covered with interchangeable steel plates held by four bolts. Any fixtures required are permanently fastened to the plate and it is not necessary to drill any holes in the wood tops to fasten the fixtures or to move them from one location to another. When a machine tool not adapted for bench mounting is required, the bench top is folded down and the machine is mounted on the floor.

Bench height is the same as that of the lower portion of the belt, and, as soon as the operation is performed on the part, it is placed on the belt and proceeds to the next station. In the same motion, however, the operator removes from the belt the part on which he must perform some assembly or fitting work or both. Any parts he adds are taken either from trays on his bench, when the parts are small, or from tote boxes on the floor or on a stand at convenient height at the end of the bench.

Sub-assemblies continue along the belt and are removed as required until they are added to or become complete assemblies near the end of the line and undergo run-in, test and inspection. Any assemblies or sub-assemblies not properly made and adjusted are placed on the upper tier or return-side of the belt and are carried back either to the operator responsible for the defect or to repair benches at the beginning of the line.

There are, in all, 24 benches on each side of the conveyor, but as some operations take more time than others, two or more benches, each with an operator, often are assigned to these operations. Besides the actual assembly operations, some adjustments of parts and assemblies are required to insure correct alinement and proper functioning. After assembly is completed, a strip of paper fastening staples is inserted and actually used up to make sure that the fastener performs the required operations without binding or other fault.

Accompanying illustrations give a good idea of certain of the more complex operations. Others are so simple that no description is required. Although parts are held within remarkably close limits in prior fabrication, they are subsequently hardened and often go slightly out of shape. This

makes it necessary to do some bending and certain reaming operations to insure correct fits and alinements. Fixtures are provided to facilitate such work when they can be used to advantage. There are also fixtures for riveting and for driving pins which are press fits in the assembly.

Light machines needed for assembly and test include high speed riveting hammers, kick and arbor presses for riveting, motors fitted with chucks for reamers and a special machine which automatically operates the assembled machines while staples are run through, as if in normal use, except that the staples are not clinched. Clinching tests are afterward made, however, by hand as in normal service. A run-in test, feeding a staple at each stroke, is made on a special high speed machine equipped with rocker arms which permits eight assemblies to be operated simultaneously. After testing and final inspection, assembled machines reach

the final station where the bright finish is wiped clean of finger marks and a rubber cap is applied at the top of the ram. The assembly is then passed to a packer where it is wrapped and put into a box.

Assembly is on an 8-hr. basis with 5-min. rest periods at the ends of the second and sixth hours and time for lunch at the end of the fourth hour. A single foreman supervises the work. New hands are sometimes stationed at the outer end of the individual benches and are instructed by the outgoing operator while learning. Although operators become skilled quite quickly through experience, the design of the stapling machine and of assembly fixtures is such that it is not necessary to employ skilled mechanics having general outside training except for certain of the more critical adjustments. Operators sometimes change about when they become tired of too long repetition of the same operations.



AT one station the bench, hinged to the conveyor frame, is folded down and the high speed riveting hammer is placed directly on the floor. The parts required are taken from trays conveniently placed and the assembly advances on the belt conveyor. At the next bench, at left, the operator reams some holes and uses the small hand arbor press to drive a pin.

Rolling Flat Wire

THIS investigation deals with the more detailed data on the influence of different rolling conditions on the increase in width, i.e., the spread during the cold rolling from round to flat of steels of different production, chemical composition (all high carbon), etc. The presentation that appears herein is an abstract and translation of report XX, issue 14, of the Kaiser-Wilhelm Institut für Eisenforschung, Düsseldorf, Germany.

• • •

THE increase in width, as a result of the reduction in thickness of a metal between rolls under any specific conditions, is termed "spread." The cold rolling of flat wire, so-called wire flattening, from round sections is an important production process. Not only are large quantities of flat wire turned out from low-carbon steel, but there is also a rather considerable production of flat wire from high-carbon steels. It is the wire flattening in high-carbon steels that this investigation is exclusively concerned with.

Fabrication starts with the cold drawing of wire to a diameter which is usually determined by practical experience. This drawn wire is then either soft-annealed or patented, and then rolled down to the desired final thickness in one or several passes, which, depending on prevailing conditions, may necessitate one or more intermediate annealing or patenting treatments. The diameter of the initial round section must be selected so as to obtain the required flat wire width within the specified gage allowance, at the same time taking into account the spread occurring during the cold rolling process. Permissible gage deviations for very narrow flat wire amount to only a few ten-thousandths of an

inch, and oftentimes to ± 0.006 in. in width for widths of over 0.20 in.

Needle wire, fret-saw wire for wood and metal working, spring wire, umbrella wire and the like are the main products fabricated in this way. The carbon contents of these wires may vary between 0.6 and 1.3 per cent. The smallest dimensions specified for metal fret-saws amount to 0.012×0.006 in. and the largest ones for spring wire to 0.48×0.16 in.

Depending on the rod diameter at the start, any desired thickness may be obtained by suitable roll adjustment when rolling from round to flat. Given unrestrained spreading, there will obtain for every thickness a definite width which depends on the conditions prevailing during the rolling process. The roller determines the initial round wire diameter and number of passes required for a given flat wire dimension mostly on the strength of traditional practical experience condensed to so-called handy formulae or hand rules. The formula

$$d = \frac{b + h}{2}$$

is used frequently, where (d) is the initial diameter of the wire, (h) the height, i.e., the thickness, and (b) the width of the flat wire, in millimeters.

Generally, the application of this formula strikes surprisingly well the dimensions specified for the flat wire.

Previous Research

According to previous investigations, the rolling speed has practically no effect upon the spread, and the increase in width rises with increasing roll diameter. This latter fact is conditional upon the increase of the compressed length with the increasing roll diameter, resulting in higher flow resistance in the rolling direction and consequently causing a larger metal flow in the lateral direction. The influence of the nature and conditions of the metal on the spread have been investigated chiefly with reference to low-carbon steels.

Preliminary cold forming seems to have no effect upon the spread. Furthermore, spread depends on the width of the metal to be rolled. With all pass reductions there obtains a maximum value for the increase in width at a definite lateral ratio. The influence of the strip width on the increase in width becomes gradually less with the lateral ratio increasing. Frictional influence during the rolling process will be greater the thinner the metal is in proportion to roll diameter. Increased friction, resulting with the usual pass reductions, is seen to bring about a larger spread because the flow resistance is increased in the longitudinal direction. Increase in width progresses about proportionally to the reduction in thickness as long as the thickness ratio (thickness of metal in relation to the roll diameter) does not become too small or the friction between the roll and the metal in contact is insignificant. However, the spread

increases faster than the thickness decreases if the metal is very thin and if the roll surface is rough.

According to research carried out by C. E. Davies¹ on the influence of cold rolling from round to flat on spreading, the spread is said to increase with the increasing reduction in thickness, while the nature and physical conditions of the metal rolled as well as the rolling speed and the roll diameter are stated to have on the spread but very little or no effect at all. Reduced friction by lubrication is said to produce a higher increase in width. According to Davies, it is possible to determine the required diameter (d) for a flat wire thickness (h) and width (b) by the equation

$$d = \frac{2(b + h)}{K\pi}$$

where (K) represents a constant value of approximately 1.2.

Thus, the problem involved consists in establishing further data covering the conditions which exert any influence on the spread when flat rolling round sections between smooth rolls, so as to obtain a reliable method by means of which it would be possible to foretell with more accuracy the required initial diameter for rolling flat wire of definite dimensions.

To this effect a series of tests were

¹"Spread of Metal in Rolling," *Engineer*, London, 141, 1926, pp. 598 to 600 and 626 to 627.

TABLE I						
Chemical Compositions of the Steels Tested						
Marking	Type of Steel	Analysis, Per Cent				
		C	Si	Mn	P	S
A	Electric steel	1.11	0.30	0.52	0.024	0.006
B	Electric steel	0.83	0.22	0.60	0.029	0.012
C	Open hearth steel	0.50	0.23	0.75	0.028	0.028
D	Open hearth steel	0.70	0.31	0.65	0.027	0.036

carried out with four different steels, the chemical compositions of which are shown in Table I.

In accordance with the following procedure, these tests were concentrated chiefly upon steels A and B. Wire rod of 0.20 in. diameter such as used for needle wire production, was drawn to 0.11 in., 0.08 in., 0.04 in. and 0.02 in. diameter respectively, with several intermediate reheatings and after a reduction of about 30 per cent for each individual drawing. After the last soft-anneal, the test pieces were submitted to a subsequent slight reduction of 10 to 15 per cent by being drawn through dies. The cementite texture was ascertained to be of globular structure (Condition I).

In order to investigate the influence of texture on the spread, a part of the test wire was patented, thereby converting the texture into sorbite (Condition II). Another part of the wire was normalized, thus obtaining a streaked cementite texture (Condition III).

Still another part was annealed at 932-1022 deg. F. (Condition IV), there being no alteration occurring in the cementite structure as compared with Condition I although a marked drop in tensile strength could be noticed as a result of the heat treatment. The tensile strengths for the four diameters, for each of the four conditions, are shown in Table II.

The oxidation film resulting from the heat treatment, in accordance with Conditions II and IV, was removed by slight pickling and the acid neutralized with diluted lime lye.

Further rolling tests were carried out with steels C and D to ascertain the effect of definite influence values upon the spread.

Rolling Tests

The test pieces from steel A and B, available in four different dimensions and conditions, were rolled flat on rolls of different diameters. Most of these rolling tests were carried out on

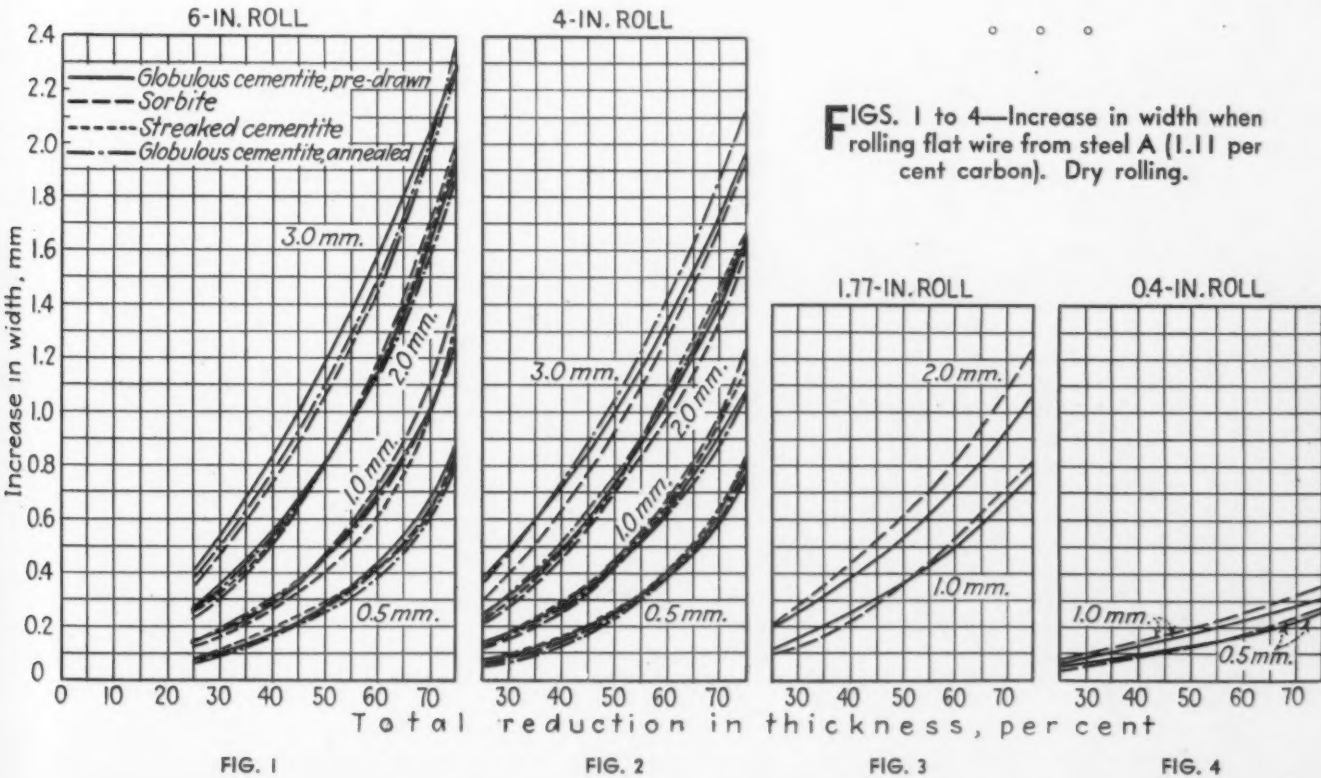


TABLE II
Tensile Strength of the Initial Test Wire
Condition of Texture

Wire Diameter, Inches	Globular Cementite, Pre-Drawn, Lb. Per Sq. In.	Sorbite, Lb. Per Sq. In.	Streaked Cementite, Lb. Per Sq. In.	Globular Cementite, Annealed at 932 deg. F. Lb. Per Sq. In.
Steel A (1.11 Per Cent C)				
0.11	115,106	222,305		104,681
0.08	129,145	219,451	130,852	98,423
0.04	125,162	227,568	128,007	93,160
0.02	124,451	220,457	128,007	93,871
Steel B (0.83 Per Cent C)				
0.11	108,095	174,943		99,845
0.08	104,112	176,223	115,206	93,871
0.04	104,966	184,879	118,051	87,471
0.02	111,508	182,054	120,896	91,027

a 2-high stand with 4-in. and 6-in. rolls respectively, while the remaining tests were made on a 4-high stand with 1.77-in. rolls and a 12-high Rohn stand with 0.4-in. working rolls. The tests were made without the use of intermediate reeling or spooling rollers so that the metal could spread freely when passing between the rolls. Only, when entering the wire into the rolls, a cloth-lined brake was used which forced the wire to run through the rolls exactly at right angles to their axes. The test piece lengths amounted to 5 to 6½ ft. It should be noted that the tests were carried out partly with practically dry roll surfaces and partly with ample lubrication of the oncoming wire and rolls, the lubricant being bone oil. The rolling program is set forth in Table III.

The passes were selected so that the total reduction in thickness, in relation to the starting diameter and corresponding to the initial thickness,

would amount to the progressive total percentage as shown in Table III. Consequently, the reductions, as referred to the thickness for each preceding pass, amounted to around 25 per cent for the first four passes and to 17 per cent for the last pass.

This pass arrangement was decided upon in view of the fact that it comes nearest to the actual fabricating procedure, as applied to the production of flat needle wire. The influence of other pass arrangements and sequences was ascertained separately by a further series of tests. The test results as obtained in the above described way are graphed in Figs. 1 to 14.

The graphs in Figs. 1 to 4 show the increase in width (in mm.) of the wire from steel A for the four individual starting diameters and texture conditions, according to roll diameters and in relation to the per cent total reduction in thickness.

It will be seen from these graphs

that the increase in width rises at first more slowly and thereupon more rapidly with the increasing total reduction in thickness. This applies in particular to small gage wire of 0.04 and 0.02 in. diameter rolled on the two largest 6-in. and 4-in. rolls (Figs. 1 and 2). With the roll diameter decreasing, the curves showing the increase in width flatten out more and more and approach the state of a straight line (Fig. 4). Given an equal roll diameter, the increase in width will be the larger the greater the diameter of the wire at the start. When rolled with 6-in. rolls and after a total reduction in thickness of 75 per cent, there obtains the following data (see also Fig. 1) with wire from steel A: 0.033 in. increase in width, for wire diameter 0.02 in.; 0.055 in. for 0.04 in. diameter; 0.077 in. for 0.08 in. diameter; and 0.098 in. for 0.11 in. diameter. On the other hand, with the same reduction in thickness of 75 per cent there are but very small differences in the increase in width between the wire diameters of 0.02 in. and 0.04 in. when rolled with the 0.4-in. rolls. For both dimensions the increase in width approximates 0.012 in. (See Fig. 4).

With equal wire diameter at the start, the increase in width decreases with the decreasing roll diameter, as may be seen from the following:

Round wire of 0.04 in. diameter from steel A shows, after a total reduction in thickness of 75 per cent, the following values: approximate increase in width of 0.055 in. for a roll diameter of 6 in.; 0.047 in. for a roll diameter of 4 in.; 0.033 in. for a roll diameter of 1.77 in.; and 0.014 in. for a roll diameter of 0.04 in. Con-

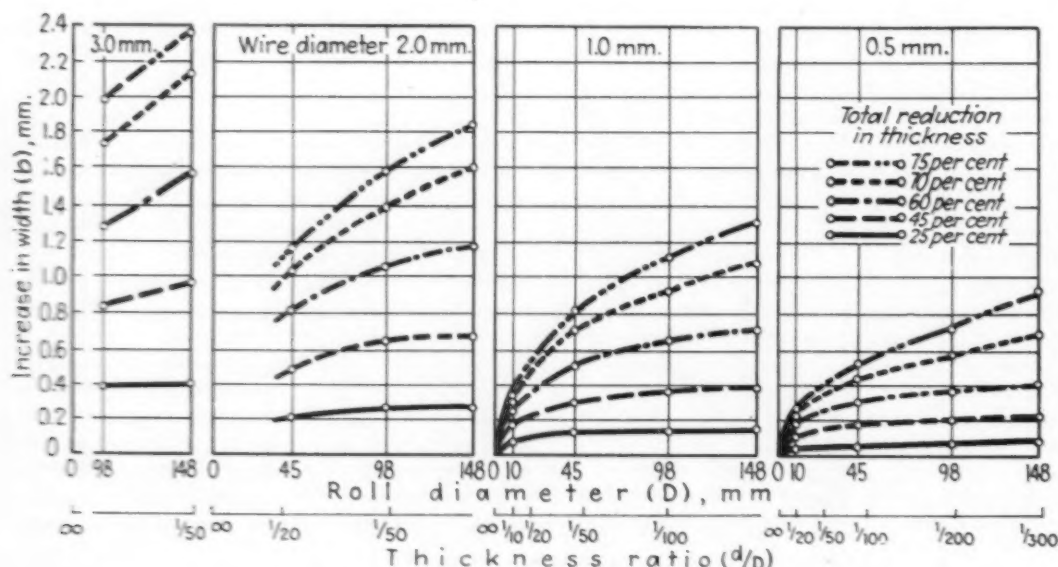


FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG. 9

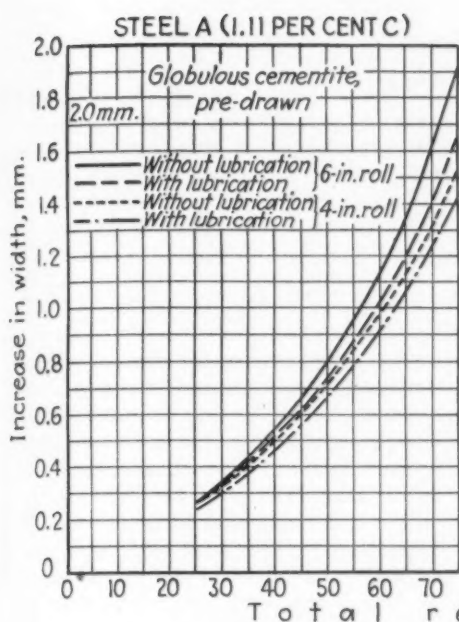


FIG. 10

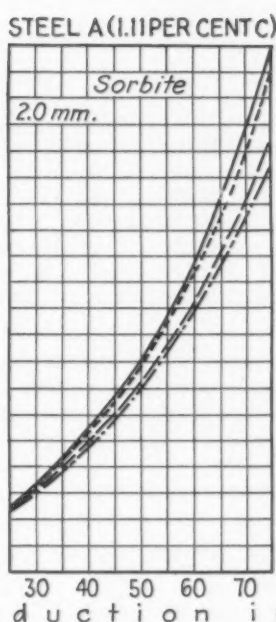


FIG. 11

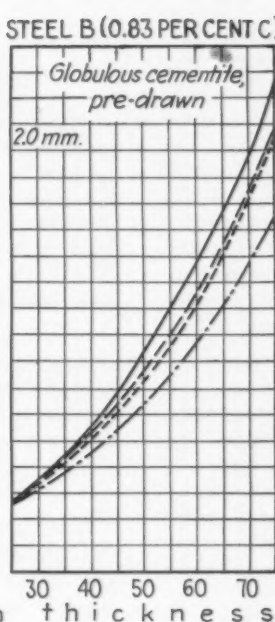


FIG. 12

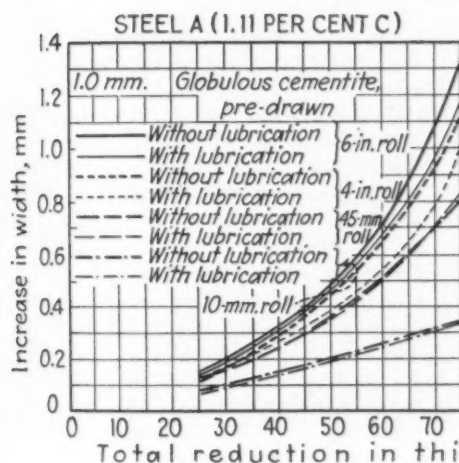
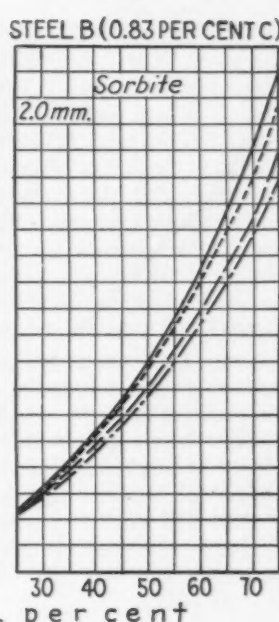


FIG. 13

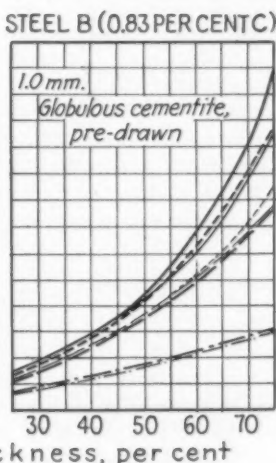


FIG. 14

FIGS 9 to 14—Effect of lubrication on spread under various rolling conditions.

sequently, at a ratio of 1:15 for the roll diameters, the increase in width grows only to the ratio of 1:4; in other words, the increase in width changes nearly proportionally to the root of the roll diameter.

The graphs showing the increase in width with reference to the various texture conditions are comparatively close to each other, and therefore the influence of texture on the spread is of no particular importance.

Quite noteworthy is the verification that with cold rolling from round to flat, the increase in width does not depend on the structure of the steel texture even in the presence of considerable variations in structure, and, by the same token, the same applies to the tensile strengths as prevailing in the case of the wire used for the tests. This ascertainment coincides with the investigation results obtained by Davies

and according to which the nature of the metal and physical properties of the wire at the start have but an insignificant influence on the spread. Moreover, it will be seen from the graphs in Figs. 1 to 4 that the carbon content of the steel is also practically without influence on the increase in width.

The effect of the roll diameter upon the spread appears more markedly in the graphs in Figs. 5 to 8, where the increase in width has been plotted in relation to the roll diameter for total reductions in thickness of 25, 45, 60, 70 and 75 per cent, covering 0.11 in., 0.08 in., 0.04 in. and 0.02 in. diameter wire from steel A, Condition I (globular cementite, pre-drawn).

With regard to the 0.11 in. and 0.08 in. wire diameters, there is only a slight variation in the increase in width in the presence of the increas-

ing roll diameter and with small reductions. For instance, at a total reduction in thickness of 25 per cent, the curves are approximately horizontal indicating that the roll diameter is of no influence on the increase in width. But with increasing reductions the curves gradually become steeper, i.e., the increase in width increases with the increasing roll diameter. The same applies to the 0.04 in. and 0.02 in. wire diameter except that the value of increase in width is lower, in accordance with the smaller wire diameters at the start. Therefore, when thus generalized, the assertion of Davies that the roll diameter has but a slight effect upon the spread cannot be conclusive—it is valid for low reductions only.

Effect of Lubrication

The preceding test results were obtained by cold rolling with dry rolls. In order to examine the effect of lubrication upon the spread, a series of tests were carried out with the metal and roll surfaces lubricated by means of bone-oil. For this purpose wire lengths were selected of 0.08 in. diameter from steels A and B, of Condition I (globular cementite, pre-drawn)

and of Condition II (sorbite) for roll-in on 6-in. and 4-in. rolls; and, furthermore, 0.04 in. diameter wire lengths of both steels A and B, Condition I, which were rolled on 6-in., 4-in., 1.77-in. and 0.4-in. rolls. The graphs in Figs. 9 to 14 show (in mm.) the curve for the increase in width when rolling with and without lubrication, in dependence on the total per cent reduction in thickness, separately and according to dimensions, nature of steel and texture conditions.

All the tests resulted in the ascertainment that, with the use of a lubricant, the increase in width is less than when rolling from dry rolls. Thus, the spread of steel A, Condition II (sorbite), with a round section of 0.08 in. at start and after a total reduction in thickness of 60 per cent, was by 0.007 in. less on the 6-in. rolls and by 0.005 in. less when rolled from the 4-in. rolls, as compared with the spreads obtained on the same rolls without lubrication (Fig. 10). It appears from this fact that the difference in the increase in width, when rolling with or without lubrication, is so much the lower the smaller the reduction in thickness.

With decreasing roll diameters the influence of lubrication on the increase in width falls back more and more, finally dropping to almost zero, as shown by the curves for the 0.04 in. diameter wire rolled in 1.77-in. and 0.4-in. rolls (Figs. 13 and 14) where they practically coincide. Consequently, the statement by Davies that ample lubrication will bring about an increase in width is not correct. In-

cidentally, it may be mentioned that the arrangement of passes and their sequence appears to have very small influence on the increase in width.

Summary of Results

It results from the foregoing that the application of the equation, as established by Davies and the handy formula as used in practical operation, for determining the initial round section to obtain a given flat wire dimension should be made use of *cum grano salis*; for sometimes such equations may lead to considerable divergences and consequently errors in foretelling the required diameter of wire to start with.

In order to supply the roller with

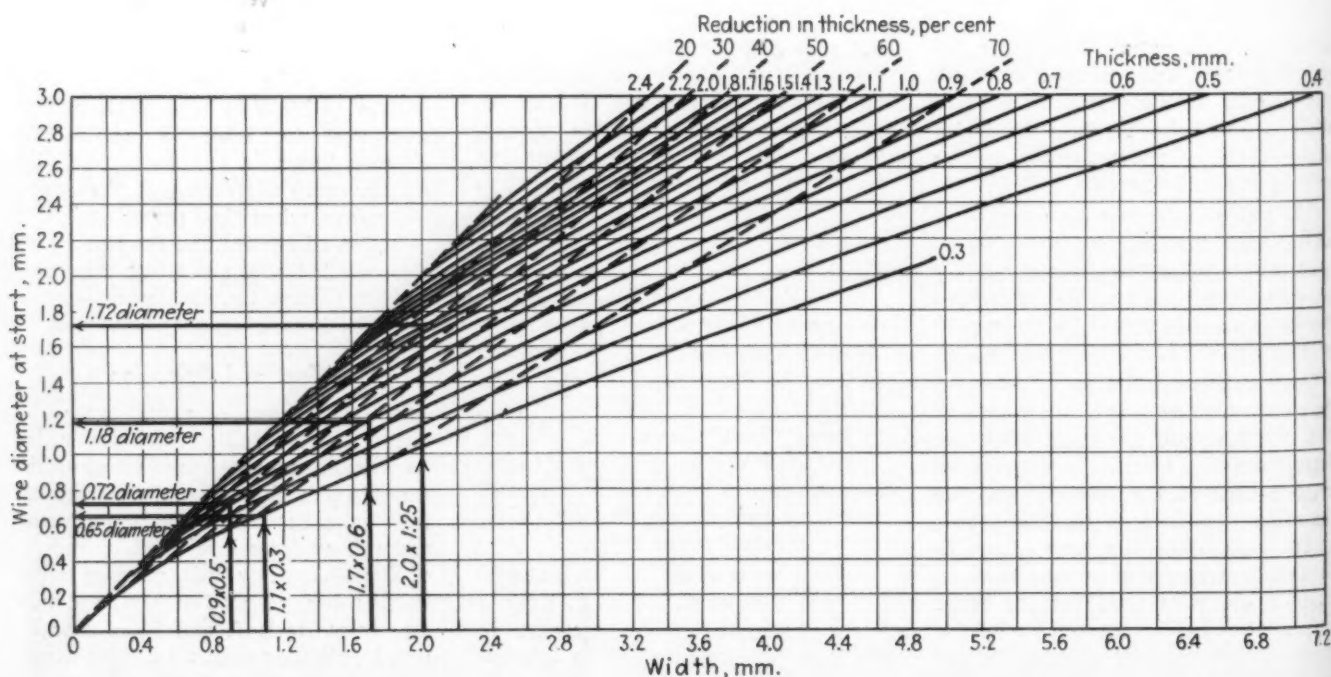
more reliable data for the determination of the initial round section required for the rolling of specified flat wire dimensions, graphs have been established for 4-in. and 6-in. rolls on the basis of the test results with dry rolls and using wire made of steel A, Condition I (globular cementite, pre-drawn). Fig. 15 is the reproduction of the graph for wire flattening in 4-in. rolls.

This graph has been established in such a manner that in the first place an auxiliary drawing was made on which the thickness of the flat wire, as related to the total width, was plotted for the individual round sections on a chart of coordinates with double-logarithmic graduation. The test points pertaining to the individual round sections, i.e., round wire diameters, were traced on a straight line. The values of width for any desired thickness, which had been determined graphically, were thereupon plotted over the various wire diameters for the 4-in. roll (Fig. 15) and the points of equal thickness linked together by means of linear tracings. This resulted in a net-

TABLE III
Rolling Program

Thickness, in In. After the		Diameter at Start, in In.				Reduction in Thickness	
		0.11	0.08	0.04	0.02	Total, Per Cent	Per Cent from Pass to Pass
1st	pass	0.088	0.059	0.030	0.015	25	25.0
2nd	pass	0.065	0.043	0.022	0.011	45	26.7
3rd	pass	0.047	0.031	0.016	0.008	60	27.3
4th	pass	0.035	0.024	0.012	0.006	70	25.0
5th	pass	0.030	0.020	0.010	0.005	75	16.7

FIG. 15—Determination of the initial round section for wire flattening in 4-in. rolls. Dry rolling.



work of curves, all of which are starting from the zero value.

Fig. 15 indicates by means of tracings furthermore the points of equal per cent reduction in thickness, affording thereby the possibility of ascertaining at once the required per cent reduction in thickness for any specified final dimension and giving at the same time a clue as to the number of passes necessary for the rolling down process. With the help of this graph it should be easy for a roller to ascertain the wire diameter at the start for any flat wire of definite width and thickness.

The tests have shown that, to a large extent, the carbon content and texture of the steel have no particular influence on the spread; therefore, this same graph will also be valid for steels with a higher or lower carbon content or of a different texture.

Moreover, the results gathered from these tests lead to the deduction of yet another significant fact: namely, when comparing the rolling processes which differ with the wire and roll diameters used while at the same time they are related in the ratio d/D between the wire diameter (d) and the roll diam-

eter (D) (besides the total reduction in thickness $\frac{(d-h)}{d}$), it will be seen that in connection with such rolling processes the increase in b/d , as referred to the wire diameter (d), is of the same magnitude. This means that geometrically analogous rolling processes will yield also geometrically analogous rolling results and that all ratios which may be formed during these rolling processes between the values (d), (D), (b), and (h) necessarily must likewise coincide.

This knowledge is of particular importance in view of the fact that it makes it possible to apply the results of a given rolling test to other rolling processes differing as to values but equal as to ratios and to establish thereby, independently of the roll diameter, a universally valid graph for wire flattening, i.e., for rolling from round to flat.

This investigation was concerned with the more detailed examination into the influence of different rolling conditions on the increase in width, i.e., the spread, during the cold rolling from round to flat of steels of different production, chemical composition

and texture. It has been ascertained that the spread increases with the reduction in thickness. Likewise, the spread increases with increasing roll diameters. The carbon content and texture of the steel have practically no influence on the increase in width. The lubrication of the metal and roll surfaces causes a lower increase in width. Furthermore, the number and sequence of passes influence the spread only to an insignificant extent. The handy formula

$$d = 0.5 (b + h)$$

which is being used frequently in practice to foretell the round section to start with, was verified on the strength of the test results. It was found that while the value 0.5 was fairly consistent with a certain part of the tests, there were also instances showing rather considerable divergences.

Graphs shown herein were presented in order to afford the rolling mill engineer more reliable data for determining the required wire diameter to start with. From these same graphs the desired indications may be gained with a higher degree of reliability than has been possible hitherto.

Sectionalized Heat Treating Boxes

HEAT treating boxes with individually cast sections, which may be replaced when cracked or burnt out at a fraction of the cost of a new box, have been developed by American Manganese Steel Division of American Brake Shoe & Foundry Co., Chicago Heights, Ill. These boxes, which also are adaptable for use in annealing and carburizing, are being marketed under the trade name Flex-box.

These boxes, available in various alloys, have ends, sides, bottoms and covers which are cast separately and joined by means of a tongue and groove arrangement (see accompanying illustration). The ends are made with vertical grooves into which fit corresponding tongues on the side castings. There are matched slots in both tongue and groove for holding pins to prevent vertical movement but which do not hinder horizontal movement.

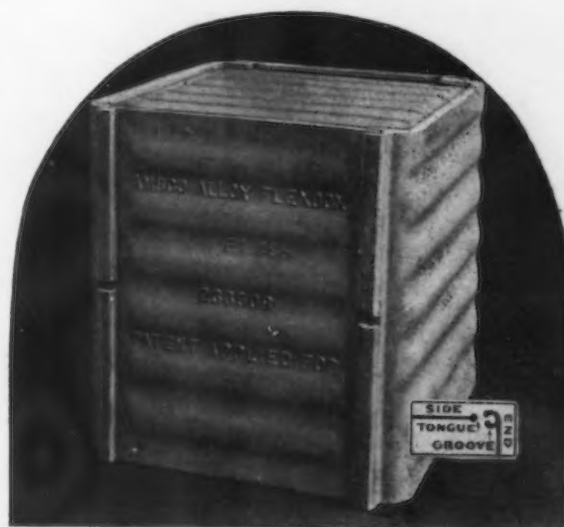
Distortion or cracking, resulting

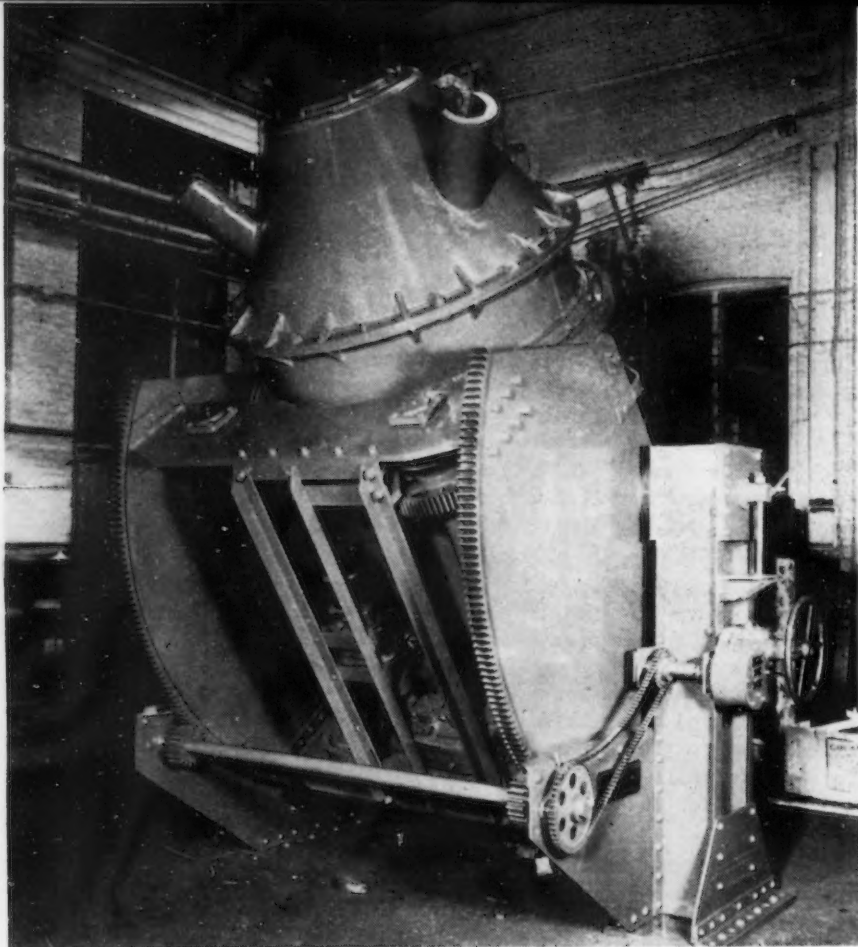
from alternate heating and cooling, is avoided by the patented design of the boxes which provides sufficient clearance between tongue and groove to permit this distortion without damaging the box. Corrugations in the cast-

ings are said to give greater strength.

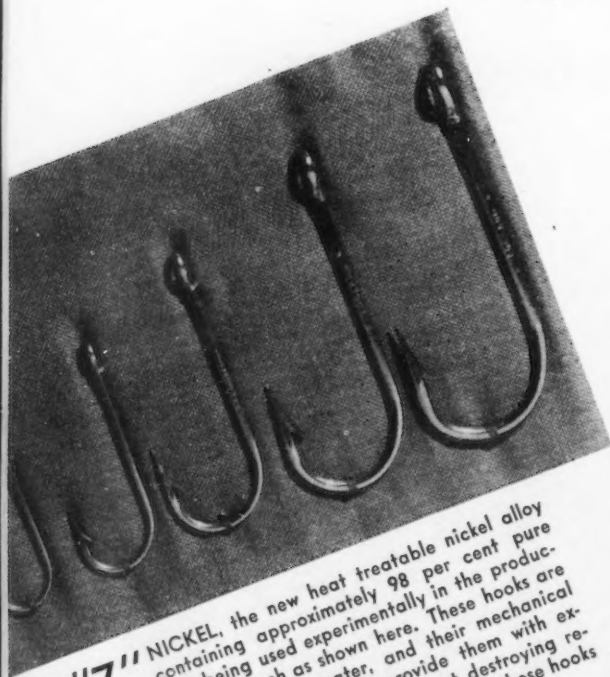
Light cast covers, with or without legs, are used to replace bottoms cast integral with the boxes. Special bottoms are available where the complete box with its contents is to be lifted.

Sections of Amsco's new heat treating box are shown here completely assembled. Small line drawing illustrates method of joining side and end sections.



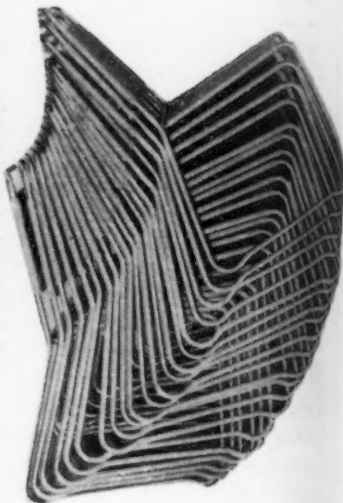
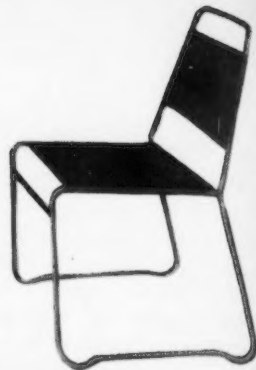


THE versatile Brackelsberg furnace is finding wide acceptance as a rapid, economical method of melting comparatively small quantities of cast steel and gray iron. The one-ton, oil-fired rotating unit with hand-operated tilting mechanism illustrated here was recently shipped to a plant in Mexico by Whiting Corp. of Harvey, Ill. These furnaces are usually fired with powdered coal. In regular commercial practice these units are being operated at temperatures up to 3150 deg. F. in producing cast alloy steel. It is claimed that with continuous use cost of operating a Brackelsberg furnace compares favorably with a cupola.



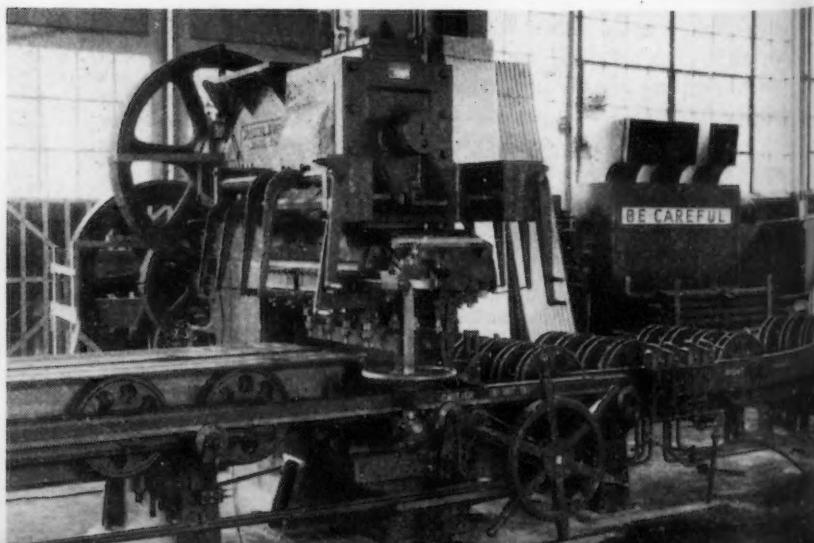
"Z" NICKEL, the new heat treatable nickel alloy containing approximately 98 per cent pure nickel, is now being used experimentally in the production of fish hooks, such as shown here. These hooks are rust proof, even in salt water, and their mechanical properties after heat treating provide them with exceptional strength and stiffness without destroying required ductility. Commercial production of these hooks is expected soon.

A NEW type of all-welded fire-resistant metal furniture which may be stacked in a very limited space has been developed by Thomas E. Smith, industrial designer for Swan Engineering Co., Inc., Newark, N. J. Built with an all-welded framework of rust-resisting seamless alloy tubing, chairs weigh only 8¼ lb. Backs are constructed of various type of fire-resisting materials. Accompanying photograph shows general design of one type of chair and method of stacking. The stack shown contains 20 chairs and occupies a space 3 x 4 ft.



What's

FOUR angles ranging from 4x4 in. to 8x8x¾ in. can be punched at one pass on the Williams-White high production punch and spacing table recently installed in a structural shop. Two carriages are used, one to push the angles through the tools at the start, the other to pull them through to the finish. These carriages are moved by a rack, with arrangement for control by air valves. From his central position, the operator also controls gripping of the work, spacing of the angles and sliding the tools back and forth to meet various gap lines. A rack at the front of the machine supports the template, made of wood or steel 3 in. wide. All punching tools are "gagged," so that one leg of angles can be punched on the front sets of tools and the opposite leg on the rear tools. This photo shows a close-up view of the tools and operating mechanism, the full machine being extended in both directions.



BELOW

SHEET metal structures designed and built by Corwin Willson of Flint, Mich., the ruling idea being that "the line of beauty is a curve." The structures are practically frameless, and are built of flexible panels which may be shipped flat and erected in the curvilinear designs shown. Left background, a refreshment stand 16 ft. in diameter; right background, a house measuring 18 x 27 ft.; the round house in the foreground is 20 ft. in diameter with space so managed as to provide two bedrooms, bath, kitchen and living room.

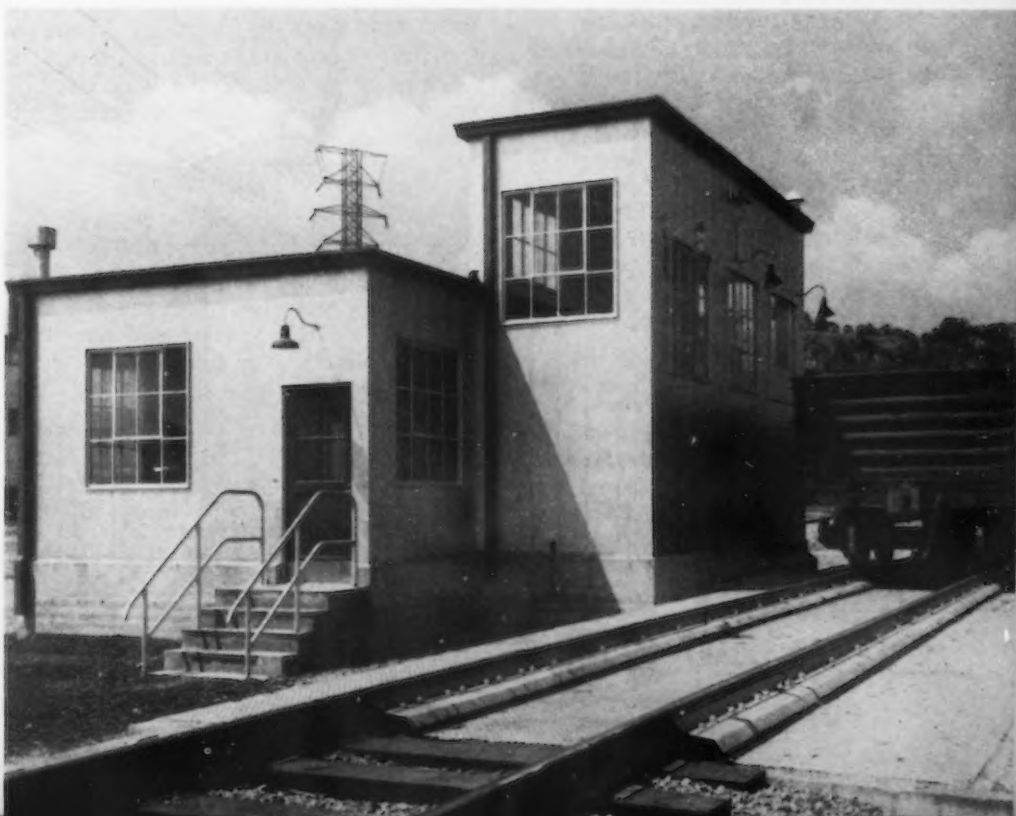


ABOVE

THIS steel cylinder, 77 in. long by 24 in. in diameter, is to be used in the pickling bath division of an Eastern steel company, is the largest cylinder ever rubber-coated by Hewitt Rubber Corp., Buffalo. One inch of rubber covers the main body of the cylinder, and the cylinder ends and large portions of the shafts are also coated, as may be seen. Two and one-half days were consumed in grinding down the rubber, the grinding being done at the rate of 0.005 in. at a time.

New!

TWENTY different pre-fabricated steel utility buildings at the Irvin works of Carnegie-Illinois Steel Corp. afford one of the largest scale demonstrations of the advantages of pre-fabricated panel type construction ever attempted. Panels for these structures were fabricated from light gage flat rolled steel sheets. Walls and roof are insulated and partitions are insulated to eliminate mill noises. The structure shown here is a weigh and traffic office; in wash and locker rooms the units were erected at a cost of \$63 per person accommodated, against \$75 for ordinary construction. Other advantages of the pre-fabricated units are ease of assembly, minimization of fire hazard and maintenance, and simplicity of installing plumbing and heating equipment.



How to Increase Steel

THE output from a steel plant may be increased by enlarging the entire plant, or by increasing the load on the furnaces, or by accelerating production by improvement of the steelmaking processes and auxiliary processes such as the casting operations, blowing plant and methods of conveying, etc.

In the following, only increases of output through improvements in the steelmaking processes will be considered. It is proposed to ascertain what possibilities exist with regard to:

(1) Increasing output with the individual steelmaking processes, basic open hearth and electric furnace processes.

(2) Increasing output by changing over from a low capacity to a high capacity process.

The operating unit to be considered in this critical examination of a steelworks capacity will be a single furnace or converter, and production will be assessed in tons (metric) of sound steel ingots per hour (an average over the whole working time less the idle periods on Sundays and public holidays).

Basic Steel Production.—The output of steel furnaces (converter) in the basic Bessemer works has grown with the development of the converter capacity from 5 to 10 tons (1900), from 20 to 25 tons (1910) and from 40 to 60 tons (1938) and is now 80 tons of crude steel per hour. A further increase in output may be attempted by a simple enlargement of the design and increase of the weight of the melt by structural alterations or by new methods of operation.

Structural alterations to the converter to achieve a greater output have been rare apart from the occasional introduction of the oval shaped converter where limited space did not permit any other method of enlarge-

THIS is a slightly abridged version of Report No. 355 of the Steelworks Committee of the Verein Deutscher Eisenhüttenleute, which appeared in *Stahl und Eisen*, July 13, 1939, and translated in *Iron and Steel* (British). Although some of the suggestions are not applicable in America, there is none the less considerable interest attached to the recommendations for increasing basic converter output, open hearth capacity, duplexing with basic converter and electric furnace, and selection of most suitable steel making process.

ment. Only recently have attempts been made to utilize the discovery made by K. Thomas¹, that the shortest blowing time, and therefore the maximum production, may be obtained if the bath which is blown through has a large cross-section. On this account the lower part of the converter is being made spherical.

If the air blasts are so arranged that as little as possible of the whirling metal is flung out of the converter mouth, the content and hourly output of a given converter may be increased. A. Jellinghaus² suggests an alteration of the converter bottom by replacement of the parallel jets by whirling air jets (whirling bottom).

Operating measures which may be applied to secure an increase of output usually include the following:

Good, hot pig iron.—It is well known that a satisfactory hourly output of good quality is most easily obtained with a pig iron of low silicon and sulphur content (about 0.2 per cent Si and about 0.05 per cent S) and a moderate manganese and phosphorus content (about 1 to 2 per cent Mn and 1.5 to 2 per cent P) and of high

temperature (about 2550 deg. F. at the blast furnace).

Unfortunately the smelting of the domestic ores with acid slag which may produce pig with over 1 per cent Si, about 0.5 per cent S and under 0.3 per cent Mn, tends to restrict efforts at raising the output, and even if soda desulphurization reduces the silicon content by 50 per cent and the sulphur content by 80 per cent a cooled, basic iron remains which is difficult to blow. If in such circumstances the basic steel production is to be raised from the pig iron side, a definite improvement must be envisaged before the blowing operation. Nor will pig iron mixers by which basic steelmakers have sought to improve the quality of their pig alone suffice because these, while effecting slight desulphurization, really only bring about a uniformity in different blast furnace tappings and no appreciable improvement of quality.

It will have to be a question of introducing preliminary refining furnaces such as have been employed for some years by open-hearth works in order to decrease a too high silicon content of the pig or else of refining troughs of the type of trough converter as evolved by Messrs. Röchling for vanadium extraction. Using ore for cooling when blowing (as in the Spetzler process) does not effect a higher output but only saves adding cold scrap to the hot metal.

Good, hot scrap.—To keep the necessary scrap as hot as possible it is usually conveyed rapidly from the rolling mills. It might, however, be possible to preheat the scrap artificially, perhaps by using hot waste gas from the converter. A technically practicable method of adopting this idea has yet to be found.

Good, hot lime.—Every improvement in the lime burning which keeps the remaining carbonates away from the converter signifies an improvement in heat conservation in the basic Bessemer process and consequently an increase in output. Preheating the

¹ *Stahl und Eisen*, 50 (1930), pp. 1165-74 and 1708-18.

² DRP No. 567, 686, August, 1931.

³ Unpublished.

Production

By GEORGE BULLE

lime, possibly with hot waste gas from the converter, might be of assistance in this direction. Lime burning with blast furnace gas instead of carbon or sulphur impregnated gas which keeps the lime free from fuel ash or sulphur, also has a favorable effect upon the required amount of slag and the sulphur content of the finished steel. The use of graded lime is likewise a step towards increased output, because graded lime accelerates slag formation and slag reaction.

Air.—With regard to the air it is a matter either of preheating or of oxygen enrichment. The improvements which can be obtained by such measures are indicated in the following table:

Effective heat in the basic Bessemer process (heat of steel + heat of slag — heat of pig), 360 B.t.u. per lb.

Heat content of air at 32 deg. F.—heat content of air at 1832 deg. F., 180 B.t.u. per lb.

Heat content of nitrogen in air on leaving the converter, 144 B.t.u. per lb. Preheating of the pig 212 deg. F., 30.6 B.t.u. per lb.

Preheating of the cooling scrap (10 per cent) 1832 deg. F., 30.6 B.t.u. per lb.

Preheating of the lime (15 per cent) 1832 deg. F., 67.5 B.t.u. per lb.

According to these figures the heat capacity of the Bessemer converter could be raised in an extreme case about 50 per cent, by using preheated air and by using oxygen in place of air; also, in an extreme case, by 40 per cent.

If the extreme case (1832 deg. F. preheating) is not possible on account of the structural and operating difficulties which would be encountered (difficult temperature control and increased blast pressure, etc.), it is nevertheless surprising that up to the present no attempts have been made to increase output by preheating the blast in the basic Bessemer department, particularly as no special difficulties should be met when introducing moderate blast temperature. The above figures show that preheating of the blast to 1832 deg. F. brings 180 B.t.u.,

preheating of 10 per cent scrap only 30.6 B.t.u., so that preheating of the blast is definitely more effective than preheating of scrap. Even a blast at 572 deg. F. would make possible the working of 11 per cent more scrap, with a corresponding rise in production.

Increasing production by the use of oxygen, as is reported by W. Eilender³, has been adopted at the Maximilianshütte in Rosenberg, although this does not represent the extreme case (pure oxygen) but only the use of blast rich in oxygen.

With the measures so far mentioned it is a matter of reducing the blowing time to increase output. A program for a converter campaign reveals that a converter only blows during 30 per cent of the time; preparation of the melt takes up 30 per cent of the time and 40 per cent of the time is occupied by repairs to the con-

verter (renewal of the bottom or of the lining). Therefore, a considerable increase in the output of basic Bessemer plant might be attempted by reduction of the preparation and repair periods although this consideration does not detract from the importance of reducing the blowing time.

Not much thought has been given in recent years to the reduction of the make-ready period with the object of developing steel production, although the make-ready period, as already stated, occupies 30 per cent of the whole time and half the working time of the converter. The swift and direct blowing of the melt without a preliminary test and rapid removal of slag without thickening with lime is falling into disuse owing to the steadily rising quality of steel demanded. For the same reason the tapping of the steel with the slag and the consequent separation of steel and slag in the

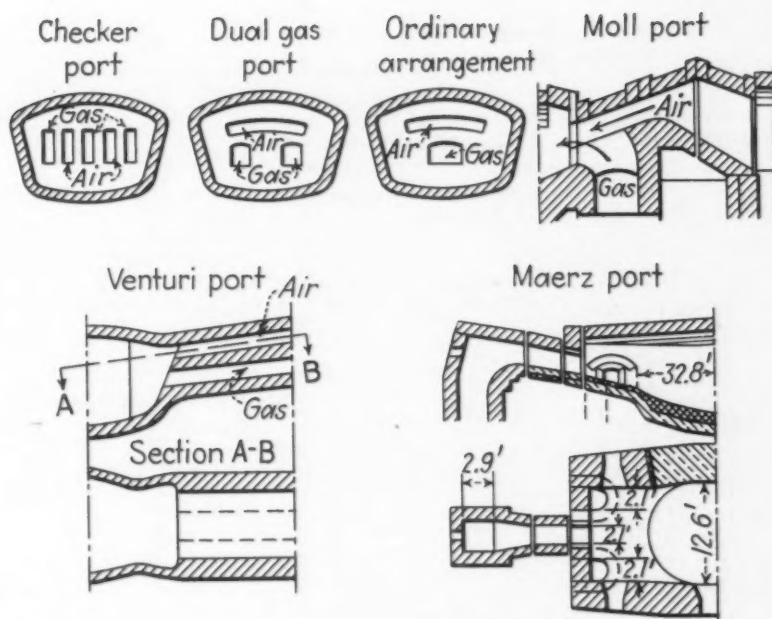


FIG. 1—Different forms of burners and ports for open hearth furnaces using producer gas or mixed gas.

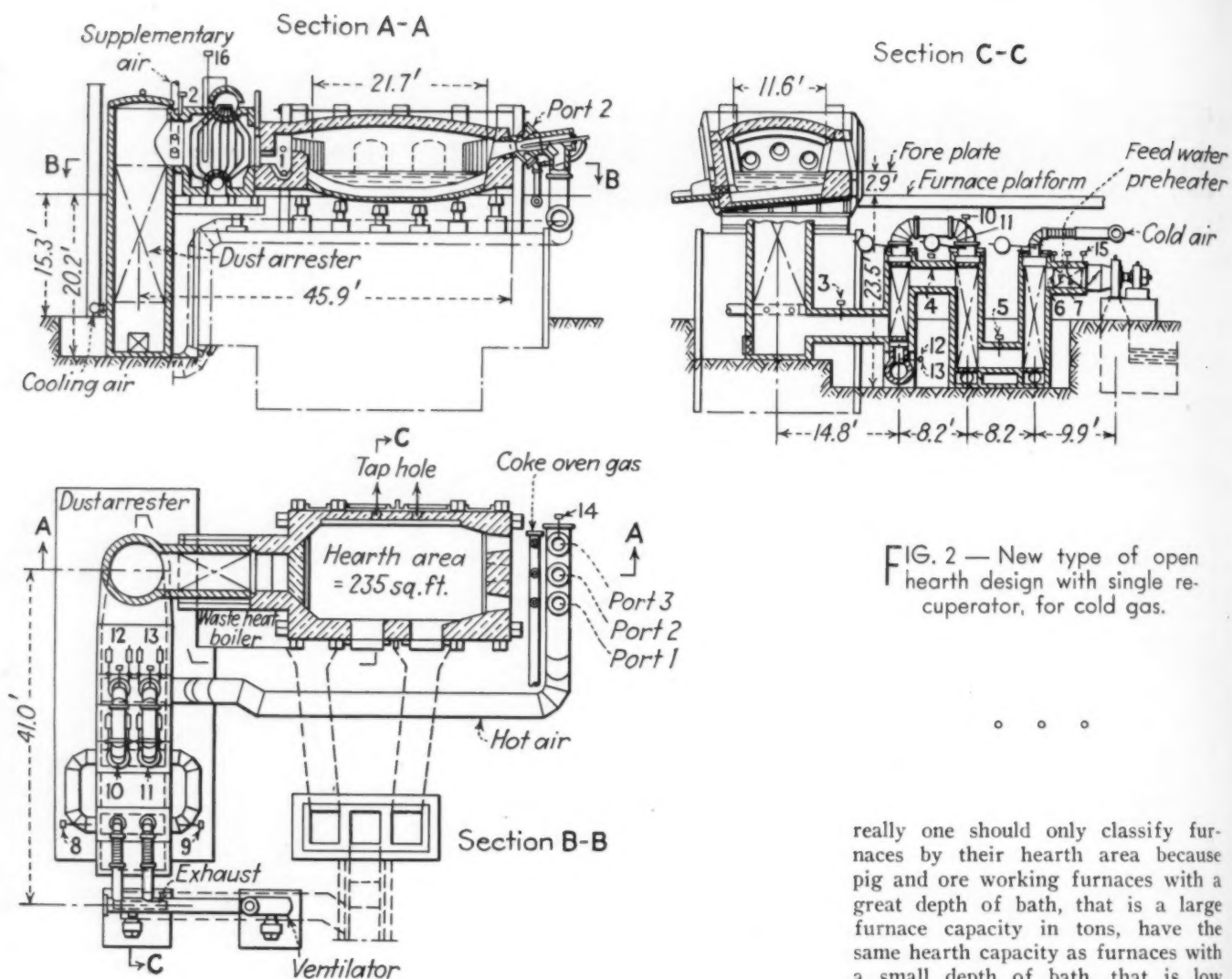


FIG. 2 — New type of open hearth design with single recuperator, for cold gas.

ladle customary in open-hearth works has not been copied in basic Bessemer operations. The reduction of the melting time which can be achieved by deoxidation with ferro-manganese in the ladle is nullified by the loss of time caused by the more careful thickening of the slag with lime.

A reduction of the reconditioning periods which are responsible for the converter being idle for 40 per cent of the time, would certainly increase the steel output quite considerably. To cut down the repairs necessary, steel plants have for some time past been paying particular attention to the lining and bottom of the converter. Comprehensive use of materials of greater refractory quality such as magnesite (for instance, for tuyere bricks) chromium magnesite or similar materials has not been introduced, owing to the high costs of these materials, so that the possibilities with improved refractories have not been explored. Efforts

to reduce periods of inspection and repair are restricted by considerations of safety in operation; nevertheless progress in this direction is by no means out of the question.

Open-hearth Production

With the basic Bessemer process hourly outputs of 80 tons (metric) per converter have been attained and a further considerable increase in output by enlarging the converter up to 100 tons per hr. is possible. In contrast to this with the normal 60 to 100 tons open-hearth furnace the hourly output is not much more than 10 tons, and even with large furnaces of 400 tons the output is little above 20 tons per hr.

The size of the open-hearth furnace is indicated here in the customary German manner, that is, in tons, although a comparison of German furnaces with English has shown that

really one should only classify furnaces by their hearth area because pig and ore working furnaces with a great depth of bath, that is a large furnace capacity in tons, have the same hearth capacity as furnaces with a small depth of bath, that is low furnace capacity in tons, operating the scrap process. The open-hearth furnaces have thus at present a very definitely lower output than the basic Bessemer converter.

An improvement in output of the open-hearth furnaces can be achieved both by heat control and metallurgical means, from the point of view both of construction and operation.

Heat Control.—Although the outward appearance of the open-hearth furnace has changed little since its inception, knowledge regarding the heat processes which take place has considerably advanced. The heat problem of the open-hearth furnace—the most rapid melting and superheating of the steel possible in order to get the maximum furnace efficiency—can therefore be far more satisfactorily tackled than previously. Endeavors are being made to secure the maximum flame temperature, the best possible heat transfer and the minimum loss of heat.

**To Be Concluded
Next Week**

WHAT'S NEW IN WELDING APPARATUS

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

JUDGING by the number of a.c. transformer type arc welders placed on the market in recent months, this style of machine is coming into wider use. Most notable advance is a design using mercury rectifiers and capable of using 1/32-in. rod and 5-amp. current for extremely fine work. Several novel designs have also appeared in generator type arc welders, and some unusual things are being done with resistance welders. In the gas equipment, particular attention is being paid to improving cutting torches and machines.

OF the several a.c. transformer type arc welders announced recently, one of the most novel of these, called a Weld-O-Tron unit by its maker, the *Allis-Chalmers Mfg. Co.*, Milwaukee, makes use of the newest type of multiple tube polyphase mercury vapor rectifier in conjunction with transformers. There are six rectifier tubes hooked up in a double-Y connection in the three-phase secondary circuit and "firing" in succession so that the envelope of the d.c. output has a relatively smooth ripple instead of half cycle humps. Thus, there is obtained the stability of d.c. arc welding at low voltages in what is inherently an a.c. machine. The arc is easy to start and easy to hold. Particularly designed for low current electronic arc welding on thin gage metals, the machine can be employed to weld with currents as low as 5 amp., using the recently developed 1/32 and 3/64-in. electrodes. Steels, stainless steel and other metals lighter than 18 gage can now readily be welded, according to the maker, without seriously burning the metal or destroying its vital properties. Sheets as thin as 0.010 in., or

approximately 32 gage, can be handled without difficulty, it is said.

The accessible controls and terminals are of the dead front type. Two of them are simple two way switches, one for current range selection, the other for reversing polarity of tube terminals. A handwheel with dial provides fine adjustment of the welding current. The machine was evolved to handle some of Allis-Chalmers own intricate work for which there was no suitable machine on the market. Range is from 5 to 75 amp.

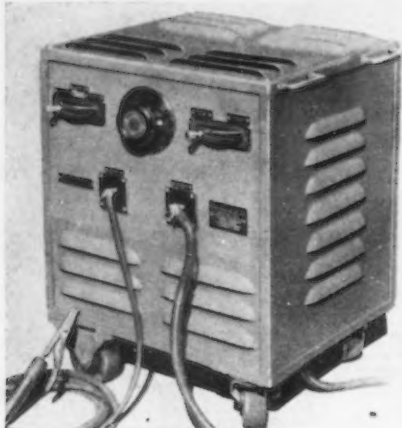
A MORE conventional a.c. machine of larger capacity, known as the Transarc welder has been announced by *Hobart Brothers Co.*, Troy, Ohio. It has a welding range of 20 to 200 amp. and operates on single-phase, 220-volt, 60-cycle current. Combination of an outer handwheel and an inner dial provides 30 steps of adjustment for work ranging from light to heavy. A special steel core keeps no-load losses at a minimum and the efficiency under load is said to be as high as 95 per cent. A feature of the design is that the striking or arc holding volt-

age increases as welding rate is reduced, making the arc easy to hold under all conditions.

HIGH efficiency (up to 95 per cent) and high power factor (up to 100 per cent) are also claimed for a new oscillating current transformer type welding machine announced by *Owen Electric Mfg. Co.*, Fayetteville, N. C. Such high efficiencies and power factors are obtained through a system utilizing inductively, oil-filled condensers in both primary and secondary circuits that are automatically thrown in or out as required by operating conditions. This system is available on a license basis.

The machine has a stepless range of 20 to 445 amp., with 220-volt or 440-volt input. Open circuit voltages of 65 and 90 are fixed. Any desired amperage setting is obtained by turning a handwheel attached to the movable reactor core. The machine accommodates all types of electrodes used commercially with both a.c. and d.c. equipment.

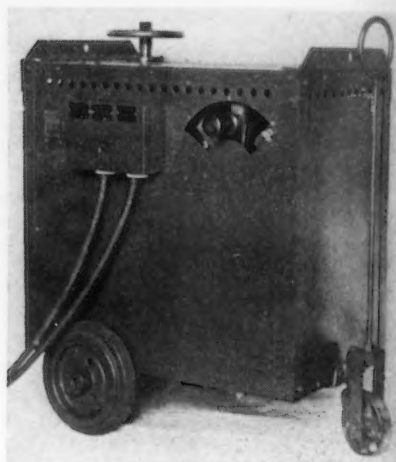
CONSTANT energy in the arc and arc stability are featured in a new line of a.c. transformer type welders put out for the first time by the *Sight Feed Generator Co.*, Richmond, Ind. These machines also operate at 95 per cent efficiency. There are four models ranging from 10 to 150 amp. up to 10 to 300 amp. Coils are air-cooled and are constructed to permit maximum cooling. A power surge of only 8 per cent is claimed on any current setting, preventing line surges. As to arc stability, the maker states the



ALLIS-CHALMERS Weld-O-Tron unit, an a.c. transformer type machine with the addition of multiple tube mercury arc rectifier, can be used to weld with currents as low as 5 amp., using the newly developed 1/32 and 3/64-in. electrodes for fabricating light gage metals, including stainless steel.

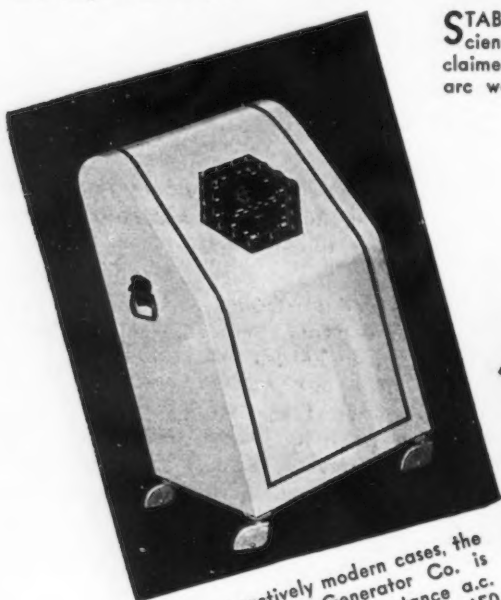


STABILITY of arc, high operating efficiency and low operating cost are claimed for the new Hobart Transarc a.c. arc welder, rated at 20 to 200 amp. range.

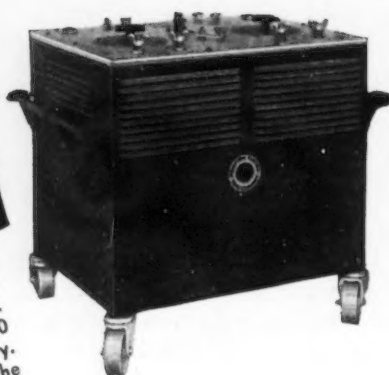


BELOW

CONDENSERS placed in both the primary and secondary circuits of this Owen oscillating current transformer type welder give the machine a power factor between 94 and 100 per cent. Stepless heating range is from 20 to 445 amp.



IN attractively modern cases, the Sight Feed Generator Co. is offering a line of reactance a.c. arc welders in four sizes from 150 to 300 amp. maximum capacity. Cables are plugged in at the ground connection and the selected amperage.



AT LEFT

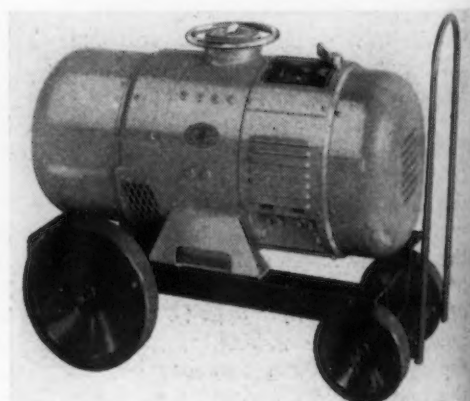
THE Hampton model E2F a.c. welder can be operated by two welders simultaneously drawing up to 280 amp. or by one welder drawing from 30 to 560 amp. Weighing 460 lb., the unit is mounted on four ball bearing casters.

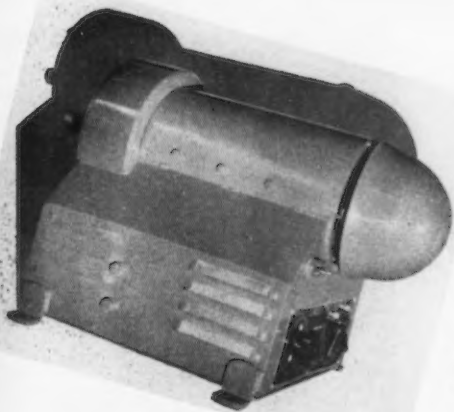


AT LEFT
COMPACT switch mounted on the welding electrode tongs gives the operator constant control of the welding heat at the point of application in the Sterling G-R remote control system for use with its a.c. welding transformers.

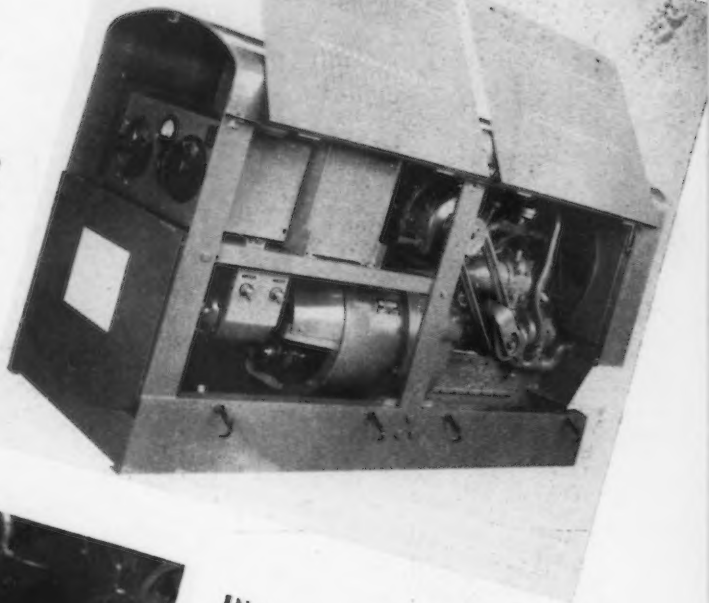
BELOW

ONE handwheel on top of the machine suffices for the control of the current settings of the new Wilson Hornet motor-generator arc welder, made in three sizes of 200, 300 and 400 amp. capacity. The small switch to the right is for changing polarity.

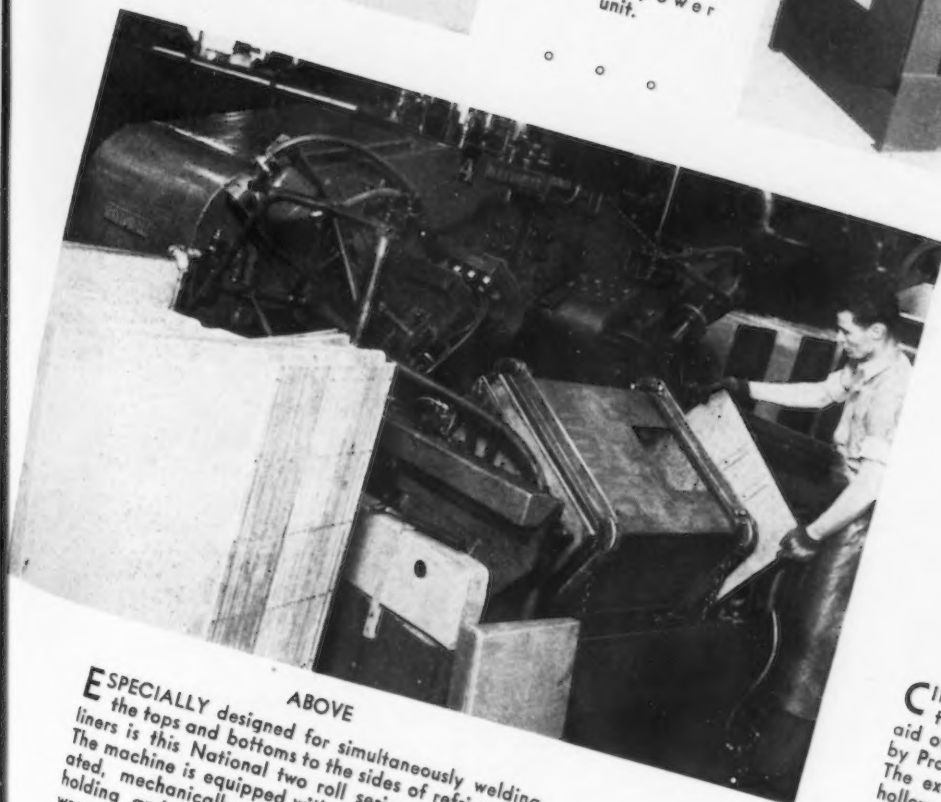




AT LEFT
THIS Lincoln Shield-Arc Junior welding generator set of 200-amp. capacity is arranged for belt drive from a line-shaft or flexible coupling drive from a suitable power unit.



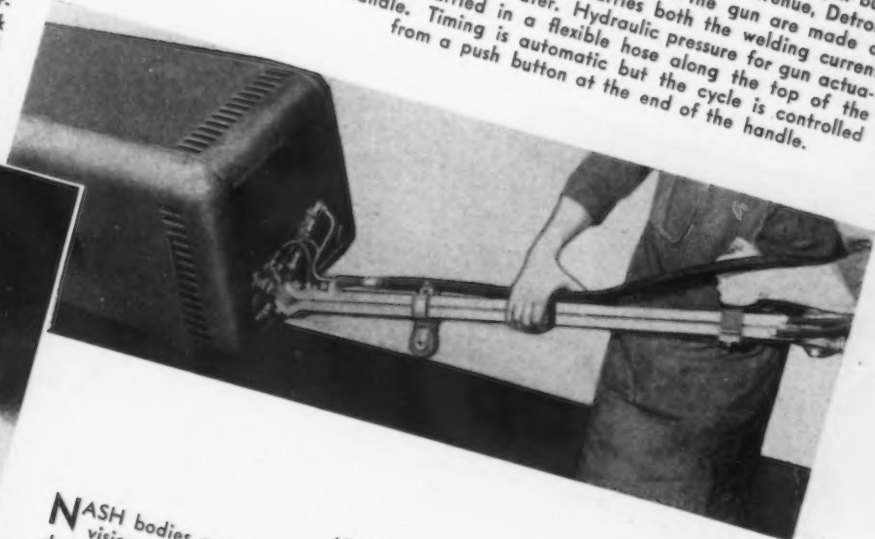
ABOVE
IN the Shield-Arc SAE unit, Lincoln is offering a diesel powered arc welder set with an auxiliary gasoline engine for starting the diesel. Connection between the two is effected by belt with clutch control.



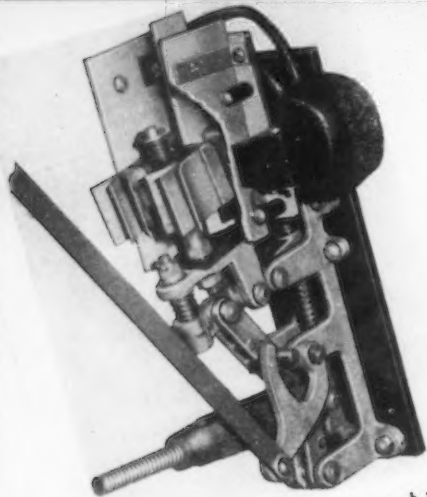
ABOVE
ESPECIALLY designed for simultaneously welding the tops and bottoms to the sides of refrigerator liners is this National two roll series seam welder. The machine is equipped with a hydraulically operated, mechanically indexed, traveling and work holding and clamping fixture, with air operated wrap-around clamps, eliminating the necessity for tack (spot) welding prior to seam welding. After one side is completed, the fixture withdraws and automatically indexes to the next welding position.



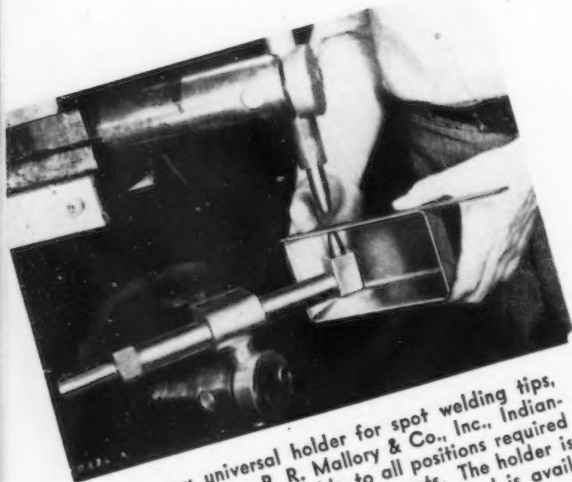
AT LEFT
NASH bodies are now being assembled at the Seaman Body division at Milwaukee by means of a new type of welding gun developed by the company, one of the first to build this type of flexible spot welder for such work. After 12 years of experimentation by Nash engineers, the production speed obtainable has been stepped up from 100 to as high as 275 spots per min.



BELOW
CIRCULATOR heater cabinets are being spot welded on the inside for their full length from one end with the aid of a special hydraulically actuated welding gun built by Progressive Welder Co., 705 Piquette Avenue, Detroit. The extension arms which support the gun are made of hollow aluminum which carries both the welding current and the cooling water. Hydraulic pressure for gun actuation is carried in a flexible hose along the top of the handle. Timing is automatic but the cycle is controlled from a push button at the end of the handle.



NEW contactor used in Ace spot welders made by the Pier Equipment Mfg. Co., Benton Harbor, Mich. In place of the usual ratchet mechanism, there is a three element linkage system operating on the toggle principle, closing the contactor until the knee joint pushes against the tip control lever and releases it. By changing the position of the trip control lever, the period of the welding stroke during which current flows may be governed. For thin metals, this time may be as low as 2 to 3 cycles. Magnetic blowouts quench the arc of the contactor and refractory arc shields confine it.

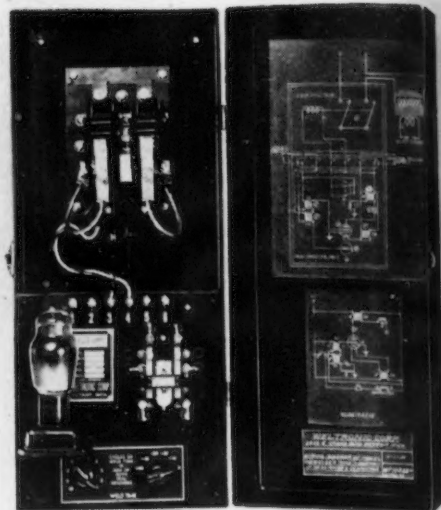


THE new universal holder for spot welding tips, introduced by P. R. Mallory & Co., Inc., Indianapolis, is easily adjustable to all positions required to reach the most inaccessible spots. The holder is assembled entirely of standard parts and is available with either a 30 or a 90-deg. tip socket. A tip knockout device is also a feature.

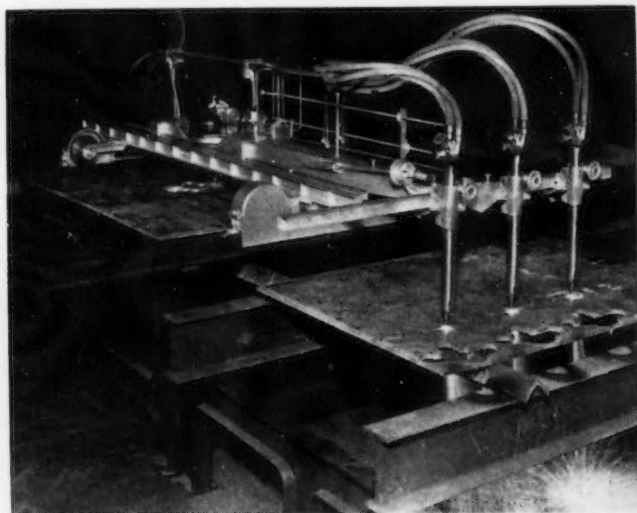
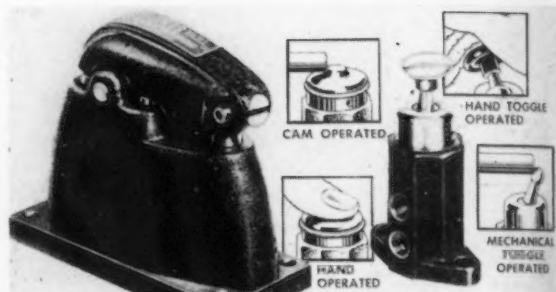


A NEW tool that re-machines both upper and lower spot welding tips to their correct profile, without necessitating removal of the tips from their water-cooled holders, also has been brought out by P. R. Mallory & Co., Inc. The new dresser saves considerable down time and insures the use of uniform contact area with the work, resulting in more uniform welds.

A NEW low cost combination weld timer and contactor applicable to virtually any manually operated 1 to 15-kva. spot welder and capable of such accuracy as to permit the welding of stainless steel, aluminum or brass, is announced by Weltronic Corp., 2832 East Grand Boulevard, Detroit. Available for 110, 220 or 440 volts and 25, 50 or 60 cycle frequencies, the new timer-contactor unit, known as model 90-53, is adjustable in 1-cycle steps over the standard 1 to 60-cycle timing range. The unit consists of a single electronic tube, a relay and a contactor, together with time selector switch mounted in a compact case.



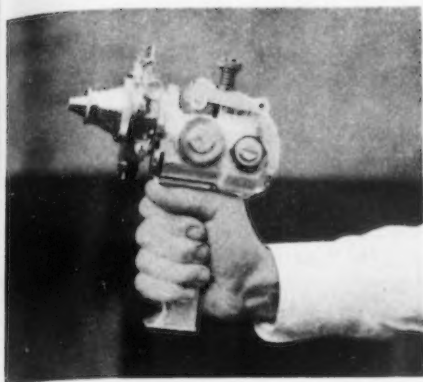
WHERE a series of successive pneumatic operations must be accurately timed, such as for spot or seam welding of automobile body parts, on all air, pilot controlled valve is being offered by the Ross Operating Valve Co., Detroit, for semiautomatic, full automatic or remote control of double acting air cylinders. The valve proper (left) is actuated by pilot controls made in various designs as pictured at the right, but retains the Ross poppet construction features, with its air seal and rapid action.



A NUMBER of important design improvements have been made in the Oxweld CM-23 shape cutting machine which supersedes the model CM-2. It can cut shapes automatically by use of a template or can be guided by hand to follow a full scale drawing.

THE Meco Cutmaster cutting torch has tubes of monel metal and a number of patented features on the head claimed to lengthen tip life.





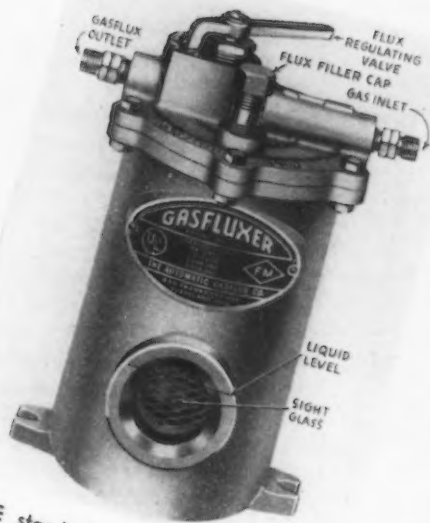
DEPOSITION speeds up to 10 lb. per hr. for steel and 35 lb. for zinc are claimed for the new model P Mogul metallizing gun which operates on propane instead of the usual acetylene. Denser deposits and finer coatings result from the use of a slower burning gas and gas costs are claimed to be 50 per cent lower, the gun consuming 3 lb. of propane per hr. and 75 cu. ft. of oxygen. The Metallizing Co. of America, 562 W. Washington Boulevard, Chicago, is prepared to sell the complete unit or an exchange head for the power unit or case of the conventional model A gun.



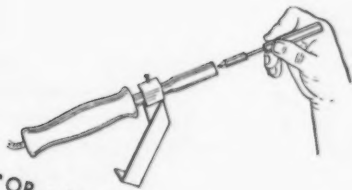
CENTRING WELDELLS, a new type of seamless forged steel welded pipe fitting announced by Taylor Forge & Pipe Works, P. O. Box 485, Chicago, has annular lips forged integral with the fitting. By firmly centering the fitting in the pipe to which it is to be welded, the lip eliminates the need for backing rings, clamps and guides for holding the fitting in position and thereby expedites the work of welding. Like other Taylor Weldells, the Centring type has full pipe thickness throughout.



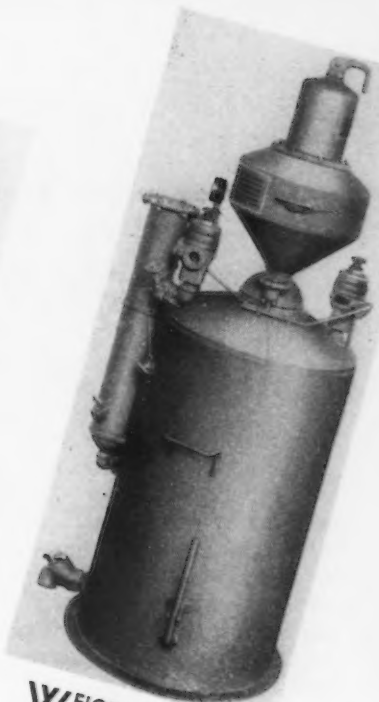
DESIGNED particularly for exhausting toxic fumes from welding operations through a hose, the Sawyer Master blower is capable of moving 680 cu. ft. of air per min. at 3 in. water pressure or higher through hose up to 75 ft. in length. The housing can be furnished with one, two or four inlet ports, which are screened to prevent damage to the impeller. Drive is by a special 1-hp. motor. This portable unit is made by the Sawyer Electrical Mfg. Co., Los Angeles.



THE standard model R Gasfluxer is made of aluminum and weighs only 6 lb. 3 oz. This unit is hooked in with the acetylene or hydrogen line and supplies a flux vapor direct to the brazing flame.



FOR soldering extremely small connections or in limited space, a pencil soldering iron is offered by the Electric Soldering Iron Co., Inc., Deep River, Conn. It consists of an Esico plug tip iron with a pencil type soldering tool. The unit heats the pencil iron quickly and keeps it at the proper temperature for instant use.



WEIGHING only 129 lb., the new Ox-weld MP-9 medium pressure acetylene generator can readily be moved about. It holds 25 lb. of size 14 ND Union carbide and will deliver as much as 50 cu. ft. of acetylene per hr. at any pressure up to 15 lb. per sq. in. The generator automatically produces a smooth flow of clean, dry acetylene with no appreciable variations in pressure. It has two relief valves and a large hydraulic back pressure valve which prevents the carrying over of water to the hose and checks the reverse flow of gases.



SAFEGUARD No. 13475 welder's glove has a back made of one piece of leather, thus eliminating burning out of seams. An extra wide strap protects and reinforces the thumb seam and all other seams are welded for extra strength. The glove is manufactured from shrink-proof, heat-resistant leather of special tannage. This is a product of the Industrial Gloves Co., 734 Garfield Boulevard, Danville, Ill.

recovery speed from $\frac{1}{2}$ to 1 cycle on 60-cycle current is from 1/20 to 1/60 sec., assuring plenty of voltage and eliminating the necessity of restriking the arc.

ONE of the heavier a.c. arc welders to appear on the market is a 500-amp. machine, recently added to the line of the *Hampton Electric Tool Co.*, 700 Walnut Street, Edgewood, Pittsburgh. This welder is designed to operate on either 220 or 440 volts, and it can be used by two operators simultaneously drawing from 30 to 280 amp. each, or by shifting a copper bar on top of the welder, it can be operated by one operator drawing up to 560 amp. Electrodes from 1/16 to $\frac{1}{2}$ in. can be used with this machine, covering the range from sheet metal to heavy castings.

NOT new on the West Coast, but announced for the first time nationally, is the Sterling G-R remote control system applied to a transformer type a.c. welder. Operated through a compact switch mounted on the welding electrode tongs, a low-voltage relay circuit controls a reversible motor which in turn operates the full range stepless heat control of output current. Welding current changes may be made without interrupting the work and regardless of the distance from the machine. Six of the seven models of a.c. welders manufactured by *Sterling Products Co.* at Los Angeles are available with this remote control system, in sizes ranging from the 20 to 125-amp. unit up to the heavy duty industrial models with a maximum output of 1250 amp.

Motor-Generator Sets

AMONG the motor-generator set type of arc welders, there have been several interesting developments in recent weeks. *Wilson Welder & Metals Co., Inc.*, 60 East 42nd Street, New York, has announced a single operator machine, known as the Hornet, that employs for its control a single, simple handwheel located on top of the unit. Adjustment of this handwheel, accurately calibrated, enables the operator to obtain an infinite number of current settings. Single pole control design is said to assure a current output that will not vary, resulting in a uniform arc. Polarity is controlled by a small snap switch on top of the machine. The Hornet is a two-bearing unit, with motor rotor and generator armature mounted on a common shaft. It is supplied in three sizes of 200, 300 and 400 amp. capac-

ity and will operate equally well on bare or coated electrodes.

FOR those who want to provide themselves with a low cost unit by building up a set, *Lincoln Electric Co.*, Cleveland, is offering a small arc welding generator suitable for belt drive or direct drive from a motor or gasoline engine. This so-called Shield-Arc Junior is rated at 200 amp., and its current range at 30-volt arc, is 60 to 250 amp. Lincoln's dual continuous control is made available on a machine of this type for the first time and permits independent adjustment of voltage and current and hence separate control of arc heat and arc penetration. Class B, non-inflammable insulation is used in the windings so that the machine can be operated with relatively large size electrodes at high average current without danger of burning out. The generator is a single operator, variable voltage type with laminated pole pieces, and the housing or frame is all steel, electrically welded.

ANOTHER new generator type arc welder put out by *Lincoln* is a 300-amp. machine driven by a diesel engine and provided with a small auxiliary gasoline engine for starting the diesel. The cooling system of the latter is tied in with the former, facilitating cold weather starting of the main power unit. The diesel uses only 1.5 gal. of fuel oil per hr. at full load as against 2.75 gal. of gasoline in an Otto cycle engine of equal power. The arc welding generator is the Shield Arc SAE unit, equipped with dual continuous control mentioned above, and is connected to the engine flywheel by a special type of flexible coupling. Generator frame is attached directly to the diesel engine bell housing.

Special Seam Welders

SEVERAL special types of seam welders have been recently built by *National Welding Machines Co.*, Bay City, Mich. One, illustrated, is for the simultaneous seam welding of tops and bottoms to refrigerator inner liners, using a single 300-kva. welding transformer and two sets of welding rolls in series. The particular features of this unit are the means of holding the tops and bottoms to the shell sides (one piece) in such a manner that prior tack (spot) welding is not necessary; and the means of indexing the work from side to side. The resulting seam requires no metal finishing prior to porcelain enameling. One operator handling two machines is capable of

producing 100 welded liners of 4 cu. ft. size per hr. More than 10 of these machines are in use today.

Another special *National* seam welder is one for seam welding paint pails from lithographed sheets. Cycle is fully automatic after the operator wraps the blank around the horn and steps on a treadle. A tack weld is first made and as the pail feeds into the seam welding rolls subsequent spot welds are made on the fly, being controlled by photoelectric cells. The welding does not injure the lithographing in any way. Such machines can produce more than 1000 pails per hr.

Gas Cutting Equipment

GREATLY increased rigidity in both carriages, insuring freedom from vibration and greater smoothness of operation and the elimination of counterbalancing from the upper carriage through the use of wheels above and below the guides, are two of the features of the new *Oxweld CM-23* shape cutting machine which supercedes the model *CM-2* machine made by the *Linde Air Products Co.*, 30 East 42nd Street, New York. A time saving feature is the provision of quick acting shut-off valves, eliminating the necessity of adjusting the blowpipe valves each time the flame is lighted. Other improvements include the addition of an independent traverse movement of 2 $\frac{1}{2}$ in. for blowpipe holder assembly without movement of the hand or template tracer; the addition of dual controls for starting and stopping the machine and for valving the flow of preheat gases and cutting oxygen; and the provision of universal blowpipe holder to permit adjustment to compound angles.

The *CM-23* machine is designed to cut shapes either automatically from templates or guided by hand direct from a full scale drawing. It is available in two sizes, with cutting ranges of 54 and 81 in. in width and 12 ft. in length. Circles ranging from 6 to 49 $\frac{1}{2}$ in. in diameter for the smaller machine and up to 72 in. for the larger unit can be cut. Both sizes may be extended indefinitely in 6 ft. lengths.

LINDE has also announced improvements in its *Oxweld* oxy-acetylene cutting nozzles to give greater precision in cutting. The cutting oxygen passage is highly polished, thus producing a smooth gas flow and resulting in a clean, smooth face of cut. Second, the preheat holes are smaller and spread over a larger circle so that the heat is less concentrated on the line of cut, resulting in a cleaner, sharper

upper edge, a smaller kerf, and a saving in preheat gases. Third, the cutting oxygen passage is exactly vertical when the blowpipe is vertical, so that when cutting shapes or circles, the face of the cut is true all around.

A NUMBER of important improvements have also been made in the Mecro Cutmaster cutting torch by the *Modern Engineering Co.*, 3403 Pine Boulevard, St. Louis. The three gas tubes are of monel metal for maximum heat resistance and structural strength. Patented features are found in the head mixer for the preheating gases and for the connection of tip to head which eliminates leakage dangers between high pressure passageways into the preheating passage as well as open leaks. Much longer tip life is claimed. The high pressure oxygen valve is controlled by a long lever on top of the blowpipe, requiring little effort for operation, and a locking device is conveniently placed at the end of the lever, further to eliminate fatigue.

Arc Welding Electrodes

FLEETWELD 10 is a new arc welding electrode offered by the *Lincoln Electric Co.*, Cleveland, for use where smooth appearance of the weld is a governing factor. Designed particularly for finish bead welding on U-groove work in downhand position, the electrode provides full slag coverage and a weld deposit of exceptional smoothness. The bead is uniform and regular, and the line of fusion with the base metal is practically unnoticeable. Finish beads can be made in V-butt joints in flat position that are flush with the surface of the plates. Fleetweld 10 can be used with either normal or reverse polarity with d.c. current, or with a.c. It is made in two sizes in 18-in. lengths, $\frac{1}{4}$ and $\frac{5}{16}$ -in.

SURFACES that require more resistance to deformation and wear than low carbon steel, but must still be machinable, can be deposited with Hardweld 50, a new coated, medium high carbon electrode developed by *Lincoln Electric Co.* In general, when deposited on straight carbon steel and allowed to cool naturally, the hardness of the deposit will be approximately 20-35 Rockwell C, depending upon the rate of cooling and the analysis of the base metal. Greater hardness may be obtained by water quench or by flame hardening. Hardweld 50 can be used for vertical welding but for best results the work should be fairly hori-

zontal. It is supplied in $\frac{3}{16}$ and $\frac{1}{4}$ in. rod sizes.

ANOTHER line of rods for depositing metal to improve the surface characteristics of the base metal are the Page Surface Saving electrodes, made by the *Page Steel & Wire Division of the American Chain & Cable Co., Inc.*, Monessen, Pa. These electrodes are alloyed to meet the demand for tough abrasion resisting materials for original surface maintenance and repair of metal parts subject to excessive wear. They all inter-alloy with the base metal when applied by the metallic arc method, thus forming a truly welded bond. Four electrodes are available, each having different physical and chemical characteristics.

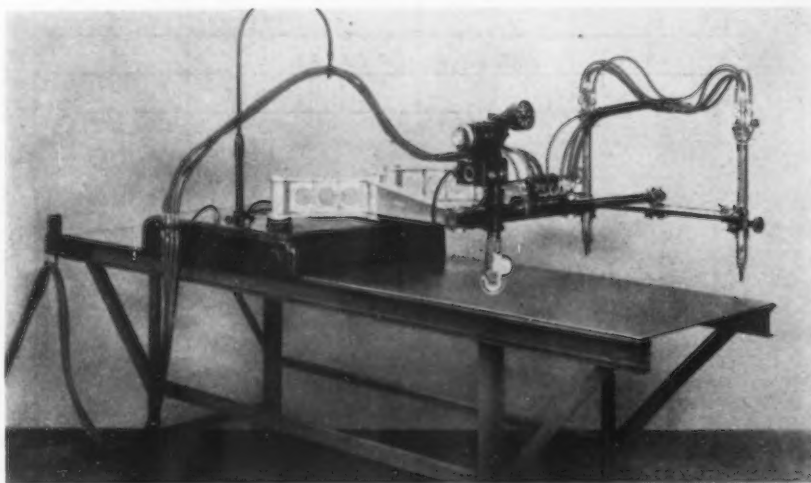
STILL another type of build-up material is found in a new rod known as Amsco Dieweld intended for the reconditioning of forging dies, hot and cold trimmers, shear knives, punches and cutting tools. This product of the *American Manganese Steel Division of the American Brake Shoe & Foundry Co.* is applicable to all ferrous base metals and is said to deposit with freedom of porosity by the a.c. or d.c. electric arc as well as by the oxy-acetylene or atomic hydrogen welding processes. Dieweld is air-hardening as welded and must be finished by grinding. For machining, however, it

can be annealed and then rehardened. It has an average hardness of 55 to 60 Rockwell. The rod is furnished coated or uncoated and in four sizes.

THE *Welding Wire Co.*, York, Pa., has developed a new type of woven welding wire, designated as No. 83-A, for use in connection with any standard automatic metallic arc welding unit for full shielded welding where the deposit weld has to meet Class 1 specifications. It can be used with straight or reversed polarity d.c., also with a.c. The spatter loss is at a minimum, the company states.

Improved Gasfluxer

SEVERAL improvements have been made in the line of liquid Gasfluxers of the *Automatic Gasflux Co.*, 700 Public Square Building, Cleveland. In brazing and other non-ferrous welding, the fuel gas is passed through the unit, which uses a wick system of vaporization of a highly volatile fluxing medium, thus delivering the flux to the work in the flame itself. The new all metal dispensers are now made of cast aluminum in various sizes for either high production or job-lot work. Another feature is the incorporation of a flux regulating valve to give a variable gas and flux mixture. Visual inspection of the liquid Gasflux level is provided through a small glass window. The fluxing fluid has also been improved



STRAIGHT lines, rectangles, circles and irregular shapes can be gas cut from ferrous metal of any thickness within present practical limits of the cutting torch by means of the new Airco No. 10 Planograph, announced by Air Reduction Sales Co., New York. Cutting range with single torch operation is 24 in. wide by 72 in. long and maximum diameter of circle cut is 24 in. With two torches, the cutting width and circle diameter are halved unless an auxiliary bar is used. Devices for hand template tracing or magnetic template following can be interchanged in the same head. Speed of the motor is governed by an index speed control disk, and the cutting speed in inches per min. is registered on a tachometer. A single knob and cam control provides for the progressive lighting of the gases from the pilot light.

THIS WEEK

By W. F. SHERMAN
Detroit Editor

ON THE

ASSEMBLY LINE

... Labor trouble preventing auto industry from setting record for fourth quarter ... Strike settlement hope is still in distant future ... Packard describes refrigerator for cooling air inside automobiles ... Chevrolet increasing use of stainless ... Hardening processes benefit overhead valve mechanisms.

DETROIT—Survey of automotive markets indicates that labor trouble is the only thing holding the industry back from setting new high marks in every phase of its activities. Had it not been for the complete

tie-up of Chrysler facilities, output for the past week might easily have crossed the 100,000 mark. Despite the strike, output rose to 82,690 passenger cars and trucks in United States and Canada from 78,210 units in the pre-

vious week, according to Ward's Automotive Reports. The corresponding figure for last year is 75,830.

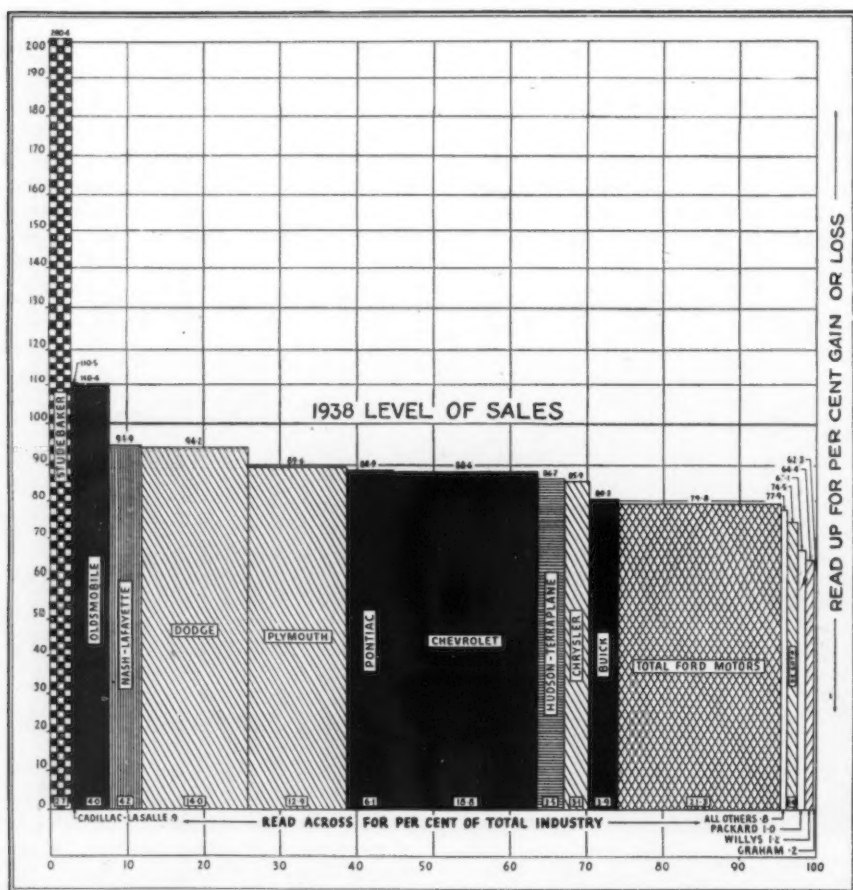
General Motors plants registered the biggest gains, turning out 44,105 units against 40,375 in the previous week. The bell-ringer was Chevrolet, which stepped up from 21,000 to 25,000. Ford output gained slightly, totaling 21,825 units against 21,450 in the previous week. All divisions of Ford showed gains, including a Ford-Mercury increase from 20,500 to 21,300 and a Lincoln-Zephyr gain from 450 to 525. Chrysler sagged again, from 1445 to 960, with Plymouth turning out only 200 units.

The continuation of the strike upsets previous estimates that there would be a record fourth quarter output of 1,250,000. The maximum possibility today is estimated by Ward's at no more than 1,150,000—and that is contingent upon a strike settlement.

Dealers Appeal for Settlement

Regarding that eventuality, there is very little that can be said. Readers will have noticed that Chrysler's lines of cars are not even being advertised, with minor exceptions in certain local areas. As a result of the prolonged strike, national advertising campaigns have been cancelled. It is a simple story—no production, no sales. The situation has become so severe that the thousands of Chrysler, DeSoto, Dodge, and Plymouth dealers have advertised appeals to the workers to go back to their jobs. It was also the dealers who initiated a move for Federal intervention in this strike. Where numbers are concerned, the dealers are an important factor, their organizations all over the nation being almost as great in number as the production group which is now out on strike.

The strike has spread in the last week, with the CIO extending its picket line to the Dodge truck plant on Oct. 31 after initiating the slowdown in the plant; 789 production workers were affected directly but additional hundreds (the plant employs 1290 persons) also were affected. In



RELATIVE sales standing of passenger cars in Canada per cent gain first eight months 1939 over similar period 1938.

WHAT will happen to Canadian auto sales during the war? The record for the first half of the year, plus two months, indicates that the industry as a whole lost 11.8 per cent from the corresponding period in 1938 in terms of cars registered. Studebaker, duplicating successes in the States, gained 100.4 per cent. Cadillac LaSalle gained 10.5 per cent, and Oldsmobile gained 10.4 per cent. Others showed losses from the 1938 level of sales, possibly because of war scare, while the U. S. gained sharply during the same period.



THE DESIGNER

"It's my job to save space
..keep down weight"



THE ENGINEER

"I've got to make it work!"



THE P. A.

"It's up to me to find the
best source of supply"



THE CUSTOMER

"I've got to use it...
will it satisfy?"

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SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

addition about 2500 are now out of work at the New Castle (Ind.) plant as a result of the strike.

Peace efforts were shifted again in location and personnel when the State Labor Mediation Board reasserted itself and called a general conference at Lansing last Thursday morning. Governor Dickinson intervened personally in the month-old dispute and apparently was a factor in bringing about some harmony between the State mediators and James F. Dewey, Federal conciliator. After a day of "blowing off steam," according to the Governor, the various conciliators and the union and Chrysler resumed negotiations in Detroit with three mediators—two State and one Federal—controlling the meetings. Chrysler has indicated a preference for continuing the negotiations with Dewey as sole mediator.

Closed Shop Still an Issue

Conversations in the last few days of the week centered on seniority problems but the underlying issue continues to be that of the closed shop or union shop.

The strike has been so prolonged that the union appears to have wavered

recently in many of its arguments and there is sufficient evidence to hazard the guess that there may be some fast back-tracking before long to ward off a possible back-to-work movement. R. J. Thomas, union president, has declared that the men would not go back to work until all points at issue are settled, but now appears very anxious to submit some of the points to arbitration—presumably to hasten getting the men back to work.

In view of the fact that many union proposals or arguments which are heard during major negotiations originate in a small way, it is worth while continually to check on what is happening in smaller organizations and parts plants. A novel seniority clause was included in a contract signed by Zenith Carburetor Co. and the CIO a few days ago. It states that "in case of the death of any employee, the next immediate support of the family will be given preference of employment when new employees are hired." Another clause provides vacations with pay.

Packard's New Air Cooling

Packard has released a description of a mechanical refrigeration air-cool-

ing system offered as a standard, factory installed, extra-cost accessory. The new unit cools or warms air inside the automobile and also filters and dehumidifies it. The refrigerating unit is much the same as any home mechanical refrigeration unit, according to W. M. Packer, vice-president.

The refrigerating coils are located back of the rear seat in an air duct, with heating coils in another compartment of the same duct. An electrically driven fan blows the air over either of these units and through a filter. The treated air flows along the top of the car toward the front and returns along the floor, passing underneath the seats. Humidity is lowered by the operation of cooling the air.

The compressor is located on top of the engine and is driven from the radiator cooling fan. On the basis of regular ratings for refrigerating plants (quantity of ice which can be produced in 24 hr.) Packard has a cooling capacity of 1½ tons at 60 miles per hr. and 2 tons at 80 miles per hr.

Chevrolet Uses More Stainless

Use of stainless on Chevrolet becomes a factor for the first time this year and an increase in the use of this material is indicated. Stainless is being used as a molding around the radiator grille (which itself is stamped, chrome plated) and as a top bar above the radiator grille where the name of Chevrolet appears. Stainless steel strips extend horizontally on each side of the Chevrolet emblem on the hood, and the center strip extending back to the cowl is a wide molding of stainless. The louvers on each side of the hood are stainless, representing the biggest parts of this kind ever used on an automobile.

Fisher Body is responsible for the installation of considerable quantities of stainless on the special deluxe models which use stainless around the windshield on the exterior and as a reveal molding around all the side windows. The belt molding (the long horizontal molding just beneath the window line) is a wide stainless strip also on the special deluxe. On cars below the special deluxe classification, the bead which forms the belt line is paint-stripped in a color contrasting with the body. Volume is also increased by the use of stainless along the outer edge of the running boards. Name plates on the rear of the car are also of stainless.

A major part of this molding material is understood in the trade to be a

(CONTINUED ON PAGE 79)

THE BULL OF THE WOODS

BY J. R. WILLIAMS





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MERIDEN, CONNECTICUT

THIS WEEK IN WASHINGTON

... TNEC to act as price watchdog ... Administration advisers see large steel inventories ... Unchanged steel prices for first quarter would help business, Prof. de Chazeau says ... Steel, ore executives testify.

By L. W. MOFFETT
The Iron Age

WASHINGTON — Significance for the steel industry was seen in the announcement last Saturday by its chairman, Senator Joseph C. O'Mahoney, Democrat of Wyoming, of definite plans of the Temporary National Economic Committee to act as a price watchdog. The statement came on the eve of the committee's inquiry into price policies of the steel industry and immediately after the TNEC had completed a hearing on the iron ore structure, which was treated as a preliminary and corollary to the steel study.

The Administration has a well-fixed purpose to prevent "unjustified" price rises, fearing the dangers of inflation and a resultant economic collapse. Already it is maintained that excessive inventories have been built up in consequence of heavy buying that developed upon the outbreak of the European war. Despite contrary reports, it is the opinion of Administration economic advisers that steel is among the list of basic commodities which has been purchased in excess of current requirements—it is called speculative buying—and that large inventories have been piled up.

Steel Key to Situation

Since steel is considered as the "bellwether" to industry, particular effort is being made to prevent advances in prices. The thought is that if steel prices can be maintained, the entire industrial price structure can be kept in hand. Striking in that direction at this particular time, when the TNEC steel price study is under way and announcement of first quarter prices is momentarily expected, the statement of the committee's price plans was considered tantamount to a strong suggestion to the steel industry not to ad-

vance prices under threat of facing a "field survey" by the Federal Trade Commission or the Department of Justice, or of being hauled before the committee to justify the increase.

Such a survey is provided for in the TNEC price plans where an analysis by Government agencies fails to explain price increases. As is well known, prominent economic advisers in the Administration, some of whom are members of the TNEC, insist that despite higher costs of raw materials there is no justification for steel price increases.

In his statement of TNEC price plans, Senator O'Mahoney declared that actual prices of steel products "have advanced materially," due to what he said was the withdrawal of discounts and concessions.

Discounts Withdrawn

"Although quotations for structural steel and other steel products have been announced as unchanged for the final quarter," the statement said, "it should be emphasized that there has been a general withdrawal of the discounts and concessions which had been offered during previous months. Consequently, the actual prices of these steel products have advanced materially. There is no direct evidence as to the extent of this increase."

When Senator O'Mahoney was asked what steel products were affected, he referred the inquiry to an assistant who said that the higher prices came about by establishing firmer levels on extras and withdrawal of concessions and discounts. It was stated that the TNEC investigation will develop the point fully. There did not appear to be any fixed notion one way or the other that firmer prices

on extras and withdrawal of concessions were not justified. It was explained that the steel study takes into account that base quotations alone are not necessarily indicative of the price structure but that to understand its condition it is essential to inquire into the subjects of concessions, extras, and specifications.

Purpose Far-Reaching

Much criticism has been made of the proposal that the TNEC be made a price watchdog. Senator O'Mahoney said the resolution setting up the committee gives it ample authority to investigate prices. The impression is, however, that this provision simply meant the TNEC would inquire into price policies and their economic effect and make a report to Congress next January. The plans announced by Senator O'Mahoney indicate that the purpose is more far-reaching.

Under the plan, the committee would be set up to determine whether prices should be surveyed by the FTC or the Department of Justice, and depending upon the results of the survey, the TNEC could call upon any person or group to appear at a public hearing to justify the price increase. The committee would thus assume a function that ordinarily would be performed by executive agencies under express Congressional authority.

There is also a belief that the plan is an opening wedge to set up the TNEC as a permanent body, with increasing powers, provided Congress grants them. But it has been announced that the TNEC has made "as yet" no change in the plan to make a report at the first session of the next Congress and wind up its affairs. There is a suspicion, nevertheless, that it will seek another further appropriation in order to make the committee a continuing body.

Finds Considerable Hysteria

Senator O'Mahoney first suggested that the TNEC watch prices in a letter to the President who, in reply on Sept. 29, approved the plan. Aware of the criticism of the TNEC plan, the Senator said he wanted to emphasize that it involves purely a factual study. The committee, he added, is not acting as though prices are out of line or suggesting the danger of their getting out of bounds or that there are speculative advances. He said there was considerable hysteria



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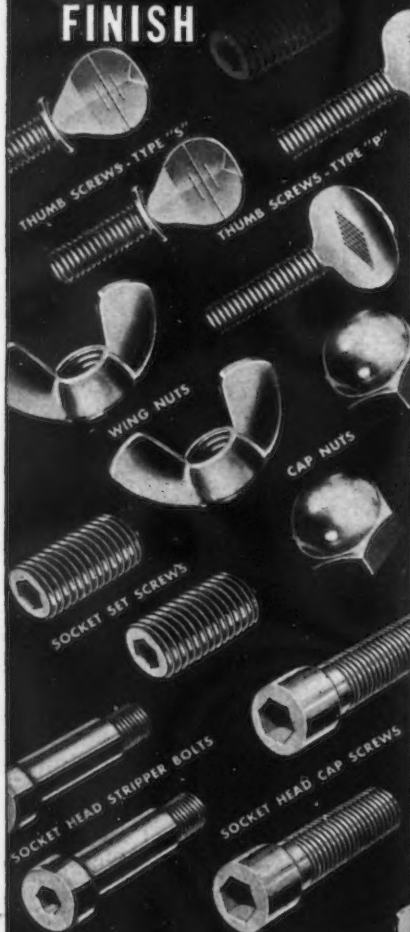
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and speculative buying on the outbreak of the war but that he thinks that price rises have now "well flattened out."

He stated that the principal purpose of the committee is to provide a forum in which price movements in the unusual conditions which now exist may be open to public knowledge. The Senator pointed out that the committee has no authority to take legal action in connection with unjustifiable price rises but that it is believed that its power of inquiry may be exercised to make it possible for business and Government both to understand exactly what is going on.

"The committee fully expects that there will be few instances of price rises without justification and, further, that business will cooperate in assisting in the analysis of all situations where any doubts may arise," Senator O'Mahoney said.

"All of the members have noted with great satisfaction the fact that business leaders in numerous lines have already undertaken to prevent runaway prices and the whole program of the committee's procedure has been carefully prepared in order to avoid the slightest danger of bringing any unwarranted criticism on business.

"It is appropriate, of course, to point

out that combinations or agreements to fix prices would come clearly within the purview of the anti-trust laws and would be subject to action by the anti-trust division of the Department of Justice. In carrying out the President's suggestion, the committee is not seeking for violations of law, but is merely pursuing its objective study of price movements in industry as affected by the European situation.

Price Movements Watched

"In the first instance, the movement of prices will be watched by the Department of Labor which will also analyze special price situations that may be brought to the committee's attention by complaining citizens. If it develops that there has been an unusual price movement, a check will be made with the Department of Commerce to judge whether or not there is a special inventory situation which might account for the price rise. If the increase is still unexplained, further checks will be made with the Tariff Commission to see if the conditions in foreign trade may be accountable. Thereupon, the situation will be discussed with the Federal Trade Commission and the Department of Justice, and such other agencies and experts



PICTURED here on the opening day of the TNEC steel hearing are (l. to r.) Senator O'Mahoney, Edward R. Stettinius, Jr., chairman of United States Steel Corp., and Benjamin F. Fairless, Steel Corporation president.

Who Invented Your Job?

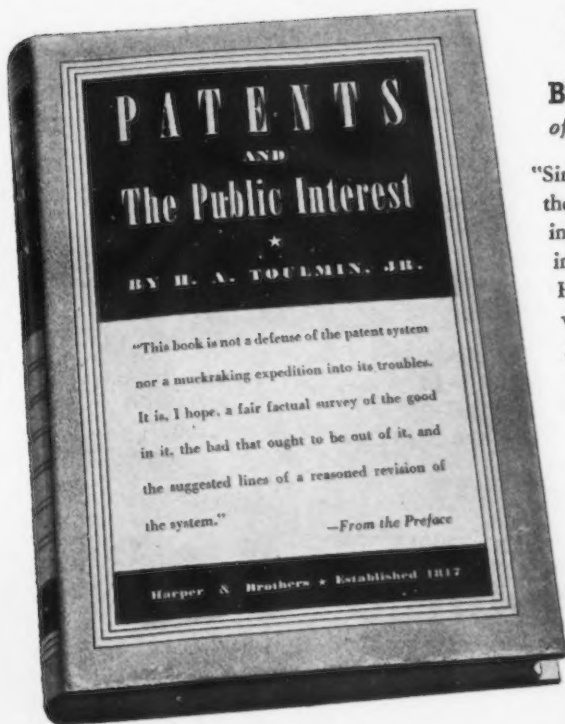
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workers for rubber tires—diesel motor engineers—designers of electric welding apparatus—factory workers producing gasoline for automobiles—makers of precision tools and instruments of all kinds for aircraft—special thermos containers—service on airplanes—work—mills—tire dealers and lamp draftsmen—

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analyzes the various proposals for reform of the patent laws, and considers the practical results of such proposals. He submits plain facts about patents and public problems: such as patent pools and illegal monopolies . . . suppression of patents . . . displacement of labor . . . the throttling of research . . . how to protect the "little man" . . .

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in the Government which may have pertinent information."

It was stated that, upon the failure of the analysis to explain the price increase, a memorandum would be presented to the committee for determining whether it should request a field survey by the FTC or Department of Justice or hold a public hearing to air a complaint.

The committee proposes to publish general analyses of the price situation made by the executive agencies. Senator O'Mahoney said the reports will be for the purpose of advising both business and the consumer of the general situation with respect to commodities where price increases have occurred. He declared that the reports will not "purport to evaluate the increases, except in such instances where thorough investigation will permit useful evaluation."

General Price Hearing

Before any specific hearings are held, it is the plan of the committee to hold a general hearing on prices, about the end of November "to provide a foundation for our future work and to inform the public of the under-

lying characteristics of the current situation." The Senator said subsequently, however, that it may not be necessary to hold the hearings. It may be, he stated, that instead the committee will make use of price studies by different executive agencies such as the Department of Labor and the Treasury Department.

The general hearing would be of an exploratory character and divided into two sections. One would consist of testimony by committee members and experts on the following general topics: The price situation before and during the last war; price situation at present; the enforcement situation with respect to prices; the inventory situation; the relation of concentration of economic power to price movements; the effect of pyramiding on price; how prices in basic commodities affect retail prices, and similar matters. The other section would consist of presentations by various trade associations and others who, the Senator said, have indicated to the committee their concern with rising prices and "who have constructive suggestions to make as to how the work of the committee may best proceed.

"In places where present information available to the Government is inadequate for quick checks of particular price movements, the committee expects to turn to business organizations themselves for such data, especially on the question of inventories," said Senator O'Mahoney. "The committee has been assured by a number of such organizations that they will cooperate freely and that they anticipate little occasion for the committee to exercise its subpoena powers to obtain the necessary information."

French Zinc Ore Exports Exempt from License

WASHINGTON—Zinc ore and metal have been exempted from export license requirements in France, according to a cablegram received by the Commerce Department from the American Embassy in Paris. At the same time export licenses were made mandatory for a number of additional products including chemicals and truck chassis.

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Unchanged Steel Prices Will Aid Industry, TNEC is Told

WASHINGTON—The Temporary National Economic Committee, going into the second phase of its hearings on the iron and steel industry on Monday, was told by Prof. M. G. de Chazeau, Justice Department economist on leave from the University of Virginia, and co-

author of the book "The Economics of the Iron and Steel Industry," that reaffirmation of steel prices for the first quarter of 1940 would tend to reduce pressure on mills from speculative purchasing, would contribute toward the industry's stability and the stability of the economy as a whole without

serious loss of profits and that while raw material costs have advanced, a more favorable operating rate has more than compensated for these rising costs.

Setting the tenor of the hearings with emphasis on prices and price policy, Professor de Chazeau read a 30-page statement on "Steel Prices in War Time" in which he gave these "generalizations" in summary:

"(1) The present demand for steel appears to be highly speculative with much of it going into inventories. As such it is unstable and likely to bring a future recession.

"(2) Although costs of firms dependent for raw materials on the spot market have undoubtedly increased, with few exceptions there is no evidence that costs for the bulk of steel production have been raised. Indeed, it seems probable that a more favorable operating rate has more than compensated for rising raw material costs. Third quarter profits available substantiate this conclusion but are not conclusive evidence because of potential depletion of stocks on hand, completion of existing favorable contracts, and resort to less efficient equipment during the fourth quarter.

"(3) Reaffirmation of fourth quarter prices for the first quarter of the coming year would probably tend to reduce the pressure on the mills from speculative purchasing. There is some reason to believe that this contribution toward its own stability and toward the stability of the economy as a whole might be made by the industry without serious loss of profits."

Price Assertion Qualified

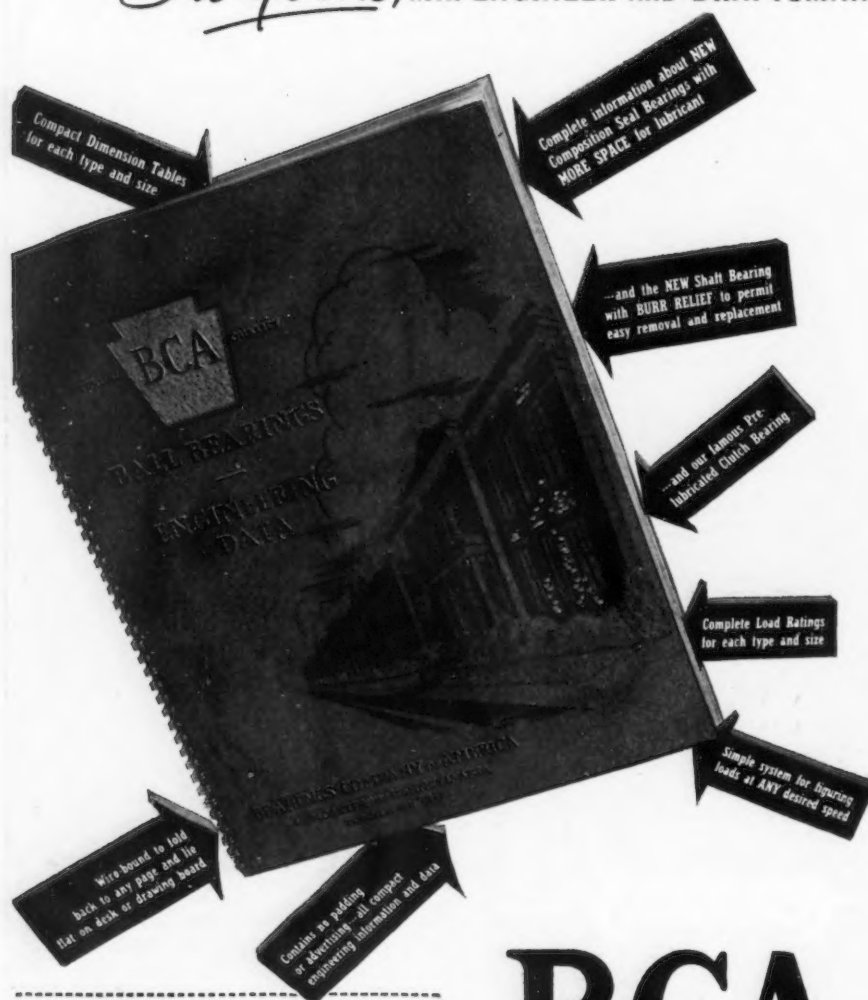
Although reflecting the same attitude as that taken by prominent Administration advisers in recent weeks with respect to steel prices and inventories—statements which have been interpreted as bringing pressure to bear upon the industry, Mr. de Chazeau qualified his assertion by pointing out that "in the absence of a cost analysis, it cannot be said authoritatively that an increase in price is not justified."

In lieu of such analysis, he turned to the financial results of operations during the third quarter, taking into consideration that increases in the operating rate during the third quarter have probably meant an increase in the actual price received for steel because of the reduction in sales made below the published price, that as pre-existing contracts at concession prices are fulfilled new contracts at published prices may be expected to improve the profit position even without

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a price advance, that, because of the necessity of bringing less efficient equipment into operation in order to meet demand, profits at any given level of prices may not continue to rise as the rate of utilization of capacity increases, and that it is possible that profits in the fourth quarter may not exceed those in the third unless prices or extras are advanced.

Discusses Company Earnings

At the present time, Mr. de Chazeau declared, third quarter profits are available for these companies: United States Steel Corp., Bethlehem Steel Co., Republic Steel Corp., National Steel Corp., Jones & Laughlin Steel Co., Youngstown Sheet & Tube Co., American Rolling Mill Co., Wheeling Steel Corp., Inland Steel Co., and Otis Steel Co. He noted, however, that while United States Steel's net of \$10,420,445 was over five times its aggregate for the first half of the year and that Republic netted \$2,815,339, or more than two and one-half times its aggregate for the first half of the year, American Rolling Mill earned less in the third quarter with earnings of \$600,793 than in the second quarter when it earned \$875,671, and Otis reported a loss of \$184,517 in the third quarter as contrasted with a loss of \$431,766 in the first quarter and a profit of \$288,804 in the second.

"Without an analysis of investment and of capital structure, depreciation and other charges, it is not possible to explain the differences in these reports or to generalize conclusively from them," Mr. de Chazeau concluded. "It is apparent, however, that to the extent that they are representative, rising prices of raw materials in the third quarter were more than compensated by a more favorable operating rate."

Estimates Rise in Costs

In attempting an analysis of such cost data as are available, Mr. de Chazeau recognized that raw materials have increased in price and referred to a recent speech by Ernest T. Weir, president of the American Iron and Steel Institute, in which the American Institute of Steel Construction was told that advances were: ferro-manganese, 25 per cent; tin, 17 per cent; zinc, 35 per cent; fuel oil, 18 per cent; and coal, 10 per cent.

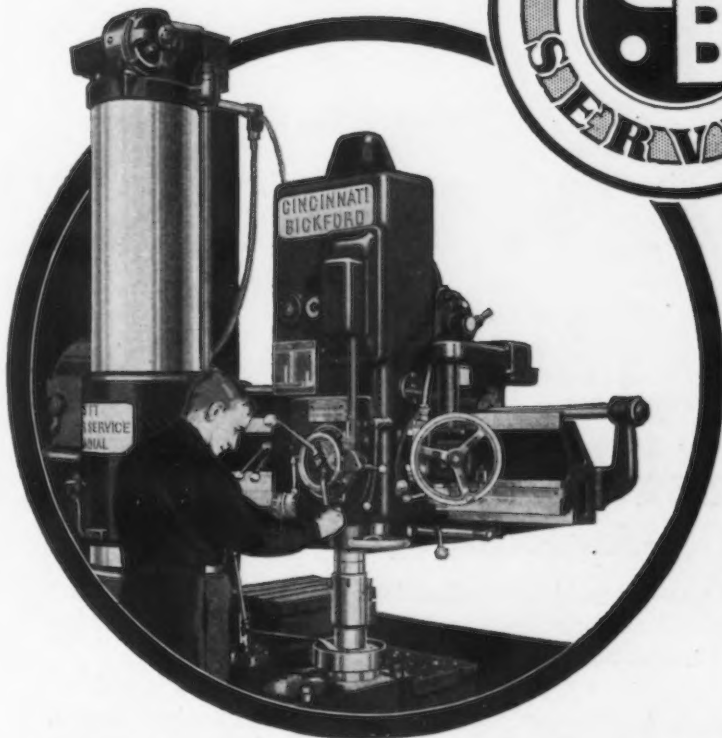
Observing that Mr. Weir did not indicate what effect these price increases could be expected to have on the cost of those steel products for which they are raw materials, Mr. de Chazeau roughly estimated that increased price of zinc would be equi-

valent to an increase of 17.6c. per 100 lb. in the base price of galvanized sheets, or about \$3.50 per net ton as compared with an existing price of \$70 per ton; and that a nominal increase of \$6.25 per 100 lb. of tin since June would indicate an increase in cost of 16.9c. per 100 lb. of tin plate as compared with the present price of \$5.00 per 100 lb. base box.

He called advances in the cost of oil, coke and steel scrap "probably

more important for the general run of tonnage steel products," pointing out that according to figures compiled by THE IRON AGE, the price of pig iron advanced \$2 per gross ton while furnace coke (Connellsville) increased \$1.25 per net ton from May to Oct. 19, this year. Since ore prices have not changed this year, Mr. de Chazeau reasoned, it is apparent that the \$2 rise in pig iron price can hardly be explained in terms of a \$1.25 increase in

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coke prices, because, coke constitutes less than 30 per cent of the raw materials used in the production of pig iron. He said the explanation "must be found in pre-existing unprofitable levels of price or, more likely, in the rise of steel scrap prices."

Scrap Rise \$6.83 a Ton

Citing the advance of \$6.83 per gross ton in the composite price of heavy melting scrap from May and October, Mr. de Chazeau continued:

"For any producer of steel whose supplies of scrap and pig iron must be derived from the market, especially if he is dependent on the existing spot market, increases of some 10 per cent in coal and pig iron prices and almost 48 per cent in average scrap prices are bound to have substantial effects on his costs despite improved operating rates. Since there is a loss of about 10 per cent in pig iron in the steel furnace at a 100 per cent iron charge, the increased price of pig iron would

be equivalent to an increase of \$2.22 per ton in the cost of steel. The conversion losses for scrap are substantially less but even if they be assumed to be only 5 per cent, an average increase in scrap prices of \$6.83 would be equivalent to \$7.19 in the cost of steel. If a 50-50 charge were used the increased cost of steel would amount to \$4.70 per ton. Thus, even though actual contract prices for materials were lower than quoted prices, higher prices quoted by semi-integrated manufacturers, especially in the eastern Pennsylvania region, for certain products probably reflect higher costs as well as the opportunity to secure premiums for early delivery while the large mills are booked to capacity.

Produce Our Scrap

"But to assume that these price increases would justify similar advances in the price of finished steel produced by integrated companies is to neglect the fact that these companies are the producers of ore, coal, coke and pig iron and that they normally produce substantially more than half of the scrap which they consume. Prices of these materials then are either reflections of price decisions by managers who themselves are in control of the predominant proportion of the country's steel capacity or are determined by bargaining in a very narrow market. (The average differential of some 30 per cent between pig iron and scrap prices is evidence of the dominance of integrated steel companies in the scrap market.) In either case their fluctuations cannot measure changes in cost to integrated steel companies except on the circular assumption that the price rise was justified by increasing costs, the very point at issue."

Professor de Chazeau opened his testimony by outlining the iron and steel price situation during the World War. He referred to the price study made by the War Industries Board as the most authoritative covering that period, mentioned the Federal Trade Commission report on war-time profits and costs in the steel industry, and told the committee that "the outstanding feature of the war experience was the failure of foreign demand to materialize for more than a year following the declaration of war."

Price Increases Expected

Contrasting World War conditions with the present outlook for the industry, he touched on the rising cost of raw materials and observed that in some products, especially cold finished alloy steel bars, there have been up-

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ward revisions in extras while some of the semi- and non-integrated producers have advanced prices on certain products. He specifically mentioned plates, nails, and reinforcing bars.

"Apparently the trade expects some increases in the published prices of iron and steel for the first quarter of 1940," Mr. de Chazeau told the committee.

Emphasizing that the natural increase in requirements of iron and steel has been exaggerated by speculation, the origin of which he said is anticipation of war purchases, Mr. de Chazeau revealed that his information as to present inventories is based upon investigations by the Department of Commerce. Although statistical data are not available, he said the inquiries show that much of present deliveries is going to swell inventories, although the automobile industry, for which seasonal demand for steel happened to coincide with the speculative war purchases of steel, is a possible exception.

Inventory Analysis Needed

Offering the explanation that the existing sellers' market is created by the expectation that iron and steel prices will rise and that actual shortages will develop, the Justice Department economist said that to dissociate these two aspects of demand would entail an analysis of inventories whose scope would be way beyond the facilities available to his department.

His warning that speculation based on expected war business is likely to be disappointing in the near future is based, he said, upon these considerations: (1) that as compared with World War days the relative importance of this country in the production of iron and steel has declined substantially; (2) measured by the output of steel, the major belligerents are better prepared for the present struggle than they were in 1914; that the credit limitations as well as shipping restrictions indicate that belligerent purchases in this country, both of steel and of other commodities, are likely to increase but slowly; and (4) that there is no reason to believe that recent heavy steel imports by neutrals from countries now at war will be shifted en masse to the United States.

"To the extent that present demand is going into speculative inventories against a probable rise in prices or even a shortage of steel occasioned by war business, there is reason to believe that it will prove short-lived and that existing pressure on mill capacity will be relieved," Mr. de Chazeau said. "A stable backlog of business from the

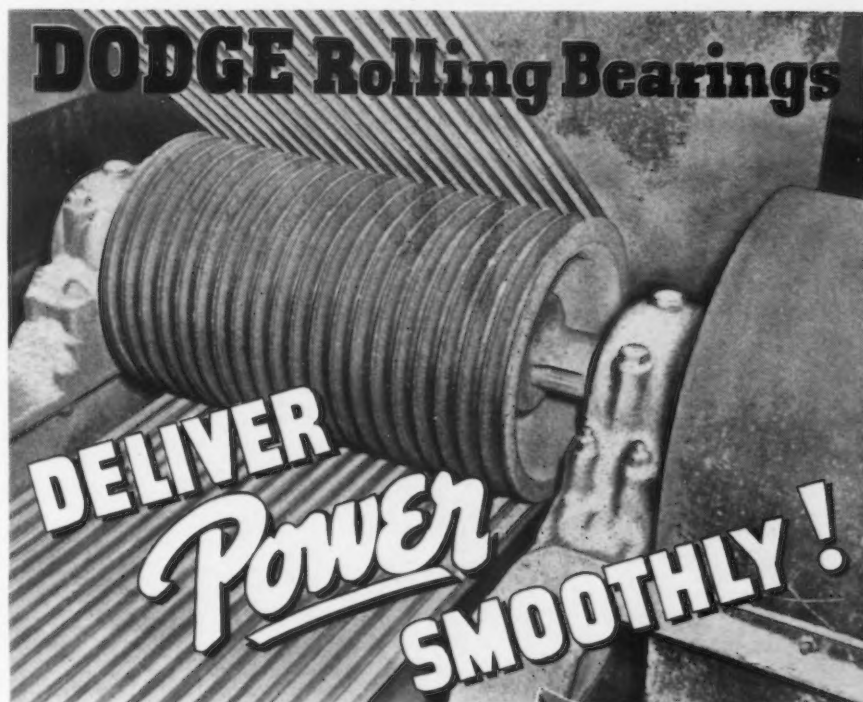
railroads, the Government defense and merchant shipbuilding program, the automobile industry and possibly the farm implement and canning industries suggest, however, that a major setback is not necessarily imminent."

Advance as Sales Strategy

Mr. de Chazeau's comprehensive discussion of the current outlook then swung to an analysis of the principal factors affecting future trends of steel prices. He covered foreign and do-

mestic demand conditions, supply conditions in the industry, and expectations of buyers and sellers. Before treating the subject of costs and prices in detail, he observed that "even though existing costs might not require a price advance or even if an upward trend in the rate of utilization of capacity were certain at existing prices to transform losses into profits, management might decide to advance prices as good sales strategy."

After the steel hearing was opened



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last Wednesday morning with a statement by Assistant Attorney General Thurman W. Arnold, published in THE IRON AGE of Nov. 2, and the presentation by his special assistant, A. H. Feller, of the Department of Justice's pamphlet "Major Characteristics of the Steel Industry," the committee and a large audience were given a vivid exhibition of the practical operations of the steel industry. This was done when the United States Steel Corp., with the approval of the TNEC and the Department of Justice, presented its striking and colorful talking

movie, "Steel—Servant of Man," in the large Senate caucus room where the hearings are being held. The picture undoubtedly gave an insight into the ramifications of the industry that most of those present never before had seen and elicited enthusiastic praise. In addition the Steel corporation distributed among members of the committee and of the press an 11 x 14 in. illustrated book entitled "A Pictorial Presentation of a Basic American Industry." The work shows both by descriptive matter and photographs the operations of the industry from raw

materials to the finished product, some of the views being in color.

O'Mahoney Impressed

Expressing the appreciation of the committee for the opportunity to see the picture, Senator O'Mahoney, TNEC chairman, said that no one could fail to be impressed by the magnitude and the precision of the steel industry. He said, however, that while physical perfection has been achieved there still remains to be developed a formula for human study to gear industries so as to provide security for all men and for the employment of men and capital. This, he said, was the primary lesson of the picture.

The first witness to take the stand was Elton Hoyt, II, of the iron ore firm of Pickands, Mather & Co., Cleveland, who told of the company's operations as a management agent for steel company owned mines in the Lake Superior region. In describing development of the Lake Superior region Mr. Hoyt said it supplies about 85 per cent of the iron ore consumed in the United States. Charts were introduced by Mr. Feller showing the movement of Lake Superior ore, the percentage of Lake Superior iron ore shipments by major iron ore companies and the financial connections between such companies and steel companies.

E. B. Greene Testifies

Called to the stand at the same time, E. B. Greene, of the Cleveland-Cliffs Iron Co., and Crispin Oglebay, president of Oglebay, Norton & Co., Cleveland, described the merger of their two companies, relating that the Cleveland-Cliffs Iron Co. paid 10,000 shares of its stock for two-thirds of the voting stock in Mr. Oglebay's company but that while the Cleveland-Cliffs Iron Co. had the legal authority to control the activities of Oglebay, Norton & Co., it had never exercised the authority.

Mr. Oglebay testified that the effect of the merger was negative so far as his company was concerned and he attributed this to adverse economic conditions from 1930 to 1938. Mr. Greene told the committee that the merger was effected because of a projected consolidation of Wheeling Steel Corp., Otis Steel Co., Republic Steel Corp., Inland Steel Co., and Youngstown Sheet & Tube Co., which never materialized.

"We thought that if the ore people grew in size as the steel people grew in size, we would be better able to hold our own," Mr. Greene said. Likewise, Mr. Oglebay asserted that his company thought it had "more to gain by sitting

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around the table than sitting on the outside."

Mr. Feller read into the record a letter written in May, 1930, by W. G. Mather, then president of the Cleveland-Cliffs Iron Co., and asked Mr. Greene to explain excerpts indicating the belief that the Oglebay - Norton merger would stabilize ore prices and that publicity might result in opposition from the public or consumers.

Mr. Greene replied that actually the reference to price stability meant little that price control had not been the result, and that reports of the consolidation appeared in the newspapers at that time. Moreover, Mr. Greene, in reply to a question by Joseph J. O'Connell, representative of the Treasury Department, pointed out he was certain the merger was passed upon by company attorneys and that it did not contravene Section 7 of the Clayton Act.

"Was there any effort by your company or other companies to fix the price of ore?" inquired Senator King, Democrat, of Utah.

"No, sir, there was not," replied Mr. Greene.

"Is there competition?" the Senator asked.

"It is very keen," responded the witness.

Replying to a question by Leon Henderson, a member of the TNEC and of the Securities and Exchange Commission, concerning the abandoned steel merger plan, Mr. Greene said he thought that integrated units in the steel industry are in a sounder position to meet competition than are the less integrated units. There is, Mr. Greene said, a better chance for producing goods at less cost and for paying better wages. The witness expressed the view that there is the keenest kind of competition among integrated steel companies.

"I don't see how we can go back to small units," said Mr. Greene.

Because of additions and expansion since then, there is less reason to organize a large steel company at present than there was in 1933, Mr. Greene said in reply to a question by Senator O'Mahoney.

Mr. Feller asked if it were not a fact that all the companies involved in the merger proposed in 1930 were integrated companies. Mr. Greene said that in his opinion some were not completely integrated.

"You would not want to say that there is price competition in the steel industry?" inquired Willis J. Ballinger of the Federal Trade Commission.

"I'm not an expert on the steel industry, but I would say there is competition," Mr. Greene replied.

Favors Competitive System

At some length, Mr. Greene told of Cleveland-Cliffs long term contracts with the Republic and Wheeling companies, its supplying of Otis Steel Co. ore requirements and lease of ore property to the Inland Steel Co., and also of the stock ownership between the ore company and steel companies.

"Is there no attempt by joint stock ownership to control competition?" Senator O'Mahoney asked.

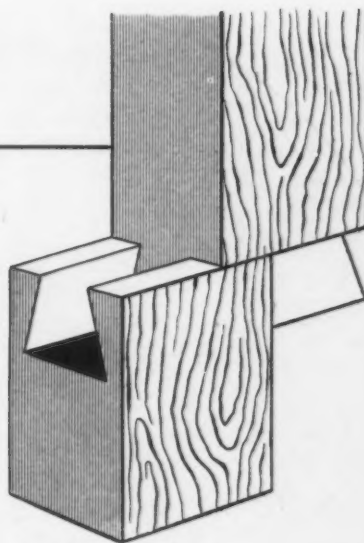
Mr. Greene said that no such attempt is made.

"Is it your advice that the competitive system should be maintained?" the committee chairman continued.

"I think it is," Mr. Greene answered.

The Senator pointed out that some people think "we are beyond the competitive stage and some people think there should be legislation to ameliorate

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competition," and inquired what Mr. Greene's opinion was.

"I am opposed to legislation to control competition," the witness said. "I believe thoroughly in the competitive system."

Responding to a further question by Senator O'Mahoney, Mr. Greene said he believes in thorough enforcement of the anti-trust laws.

"You believe competition is better than regimentation?" Senator King asked. Mr. Greene said he did.

George M. Humphrey, president of M. A. Hanna Co., and a director of the National Steel Corp., said the Hanna company operates ore mines and vessels for the steel company. The Hanna company has a large stock holding in the steel company but the latter has no stock in the ore company, Mr. Humphrey said.

Butler Bros. Independent

Emmett Butler and his son, Patrick Butler, of Butler Brothers, St. Paul ore firm, testified jointly. Replying

to a question by Mr. Feller, Emmett Butler said there is no financial connection between his firm and any steel company.

"In your opinion, if you owned blocks in steel companies would it make it easier to sell to steel companies?" asked Mr. Feller.

"I don't know," Mr. Butler said. "As a general thing it is a sale of a product and we have two or three important outlets for our ore."

Patrick Butler said that about one-third of Butler Brothers, output is sold to Pickands, Mather & Co., and told of an option held by the latter by which it was given first call on tonnage produced by Butler Brothers in excess of requirements.

As Mr. Feller swung the inquiry to the subject of prices, all six ore witnesses were summoned to the stand and after a round of picture taking by cameramen, the Justice Department representative introduced in the record charts prepared from figures supplied by the Lake Superior Iron Ore Association showing that base prices per gross ton of Lake Superior iron ore at Lake Erie Ports remained unchanged at \$4.25 from 1925 through 1928, increased to \$4.50 at the beginning of 1929 and continued at that level until early 1937 at which time it increased to \$4.95 where, the figures showed, it remains today. An accompanying chart showed that Lake freight rates on ore remained at 83c. from 1925 to 1936, and increased to 93c. early in 1937, at which rate it has continued to date.

Active committee participants in the price discussion included, in addition to Mr. Feller, Senator O'Mahoney and Mr. Henderson. The latter, who sometimes identifies himself as particularly interested in the behavior of steel prices, observed that the TNEC wants to undertake an explanation of how prices are made, that the subject of prices is considered of utmost importance and that while it was not his purpose in questioning the witnesses to imply "anything shady" he did want to know the basis for arriving at ore prices. Referring to the charts showing the ore price curve over the last 14 years, Mr. Henderson noted the price trend was "entirely different" than that obtained in finished steel, shown on another Justice Department chart which credited THE IRON AGE as the source of the data.

Explains "United Front"

Mr. Feller, who had previously referred to a letter written by Mr.



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Greene in May, 1938, in which the latter mentioned that "the combined efforts of these two interests (Pickands, Mather & Co., and Cleveland-Cliffs Iron Co.) have brought about a united front in the ore industry," was told by Mr. Greene that while it was the policy of getting together during the NRA the practice was discontinued after the collapse of the blue eagle although it did not end abruptly.

Mr. Greene testified that the words "united front" had no reference to prices and Mr. Hoyt recalled that the term originated during NRA when "we wanted to tell the Government we were agreed on a point." He told the committee that on certain questions, including such subjects as silicosis and labor conditions, all members of the industry were present at meetings and added, in response to a question from Mr. Henderson, that it was not absolutely necessary for industry members to have uniform labor conditions but that where companies operating adjacent mines make any changes in labor rates or conditions, the other mines have to follow suit.

Leading off the questioning as to how the Lake Erie base price of ore is arrived at, Mr. Feller was told that it was the result of negotiations between the seller and customers, that the price is determined by the first substantial sale made at the beginning of the season, that the price becomes known to the industry and that it remains at that level for the remainder of the season. Mr. Humphrey pointed out that the actual cash price received by the seller varies below the base price on 51.50 ore depending upon variations of the ore, penalties, premiums and other concessions. Asked by Chairman O'Mahoney if there was competition in the industry, Mr. Humphrey replied in the affirmative, insisting that the producers are operating in a competitive market all the time with "very definite competition" and that frequently they encounter competition from customers so that negotiations are carried on with the objective of showing the customer that it will be more profitable to buy rather than to mine his own ore.

Reached by Negotiation

Asked by Mr. Feller to explain why the Lake Erie base price had remained at the same level for the period 1929 to 1936, Mr. Hoyt said he could not do so specifically but that in general the price level represented the best price that could be arrived at by negotiation. In 1929, he related, when steel oper-

ations were at a high rate ore brought a higher price. Later, the whole Lake Superior district and the steel industry were burdened with ore at properties at lower lakes resulting from the overdevelopment of mines during the five years prior to 1929. When the steel operations dropped during the depression, he continued, every steel company and ore owner was faced with the problem of tremendous carrying charges on idle property, taxes constituted a heavy burden, the indus-

try tried to keep its old employees on the payroll, and operations were cut down to two days a week.

Senator O'Mahoney, recalling that the chart shows only two price changes over a 14-year period, said he found it difficult to reconcile the "high degree of uniformity" in prices of ore if it was solely the result of negotiations between individual companies and their customers. He was reminded by Mr. Hoyt that the ore business had reached a stagnation point from 1930



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to 1937, that there were practically no new sales and that his company would negotiate not on new contracts but on the basis of old ones already in effect.

Something Unusual—Henderson

At this point, Mr. Feller read a letter from Patrick Butler who wrote Emmett Butler in April, 1934, that "I saw Hoyt yesterday at which time he told me the ore magnates had decided to retain last year's market

price." Asked by Mr. Henderson if he recalled the circumstances under which the note was written, Patrick Butler told the committee that the implication in the letter was erroneous and that prices are of necessity always the subject of negotiations between seller and customer and not because of any negotiations among the sellers.

Mr. Henderson, who asserted that the base price on ore "doesn't act like prices of other commodities," said

there was "something very unusual about the situation."

"You've explained how a price is made," he told the industry spokesmen, "but not how that rate turned out to be the same every year."

Mr. Feller read a letter dated Aug. 31, 1939, from Irving S. Olds, counsel and director of the United States Steel Corp., to Assistant Attorney General Thurman W. Arnold setting forth the basis on which the Oliver Mining Co., Steel corporation subsidiary, billed manufacturing subsidiaries for ore. Mr. Olds said that the ore is billed at the established Lake Erie base price, less certain structural and shrinkage allowances. In determining the actual price of any particular grade of ore, the letter said, an adjustment up or down from the base price has to be made on account of variables for iron and phosphorus and a penalty is applied to high silica ores. It was pointed out that the Oliver company is subjected to a penalty amounting to 7½c. per unit of silica in excess of 10 per cent dry silica. The prices thus arrived at and at which the ore is so billed are, therefore, the published Lake Erie prices and such prices are entered upon the books of the company as the selling price of the ore, the letter said.

Ford Mentioned as Purchaser

Mr. Feller introduced a number of letters written by or to representatives of ore companies regarding the price situation and questioned ore witnesses closely. One letter from Patrick Butler that attracted Mr. Feller's attention referred to the maintenance of prices regardless of what Ford (Ford Motor Co.) does. He told Mr. Feller that if Ford were the first purchaser the price he paid would become the established price but that the price later might not be recognized if ore companies and customers thought it did not reflect economic conditions prevailing at the time. Concerning references to "consulting" the Big Four, Mr. Butler said they merely advised him that if his firm cut the price it would have an adverse effect on the market. He said the Big Four consisted of Oglebay, Pickands, Mather, Cleveland-Cliffs and the Oliver company. Mr. Oglebay subsequently told the committee that his company was small. Mention was made in another letter by the younger Mr. Butler to other consultations with ore executives.

Mr. Feller pressed his questions.

"In writing these letters I was not looking forward to the time I would

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- KCB COPPER STEEL
- NEWPORT GALVANNEALED
- ENAMELING GOHI IRON SHEETS
- LONG TERNE SHEETS

be sitting here and I was not choice in my language."

Before finishing up with that phase of the hearing dealing with iron ore, industry members were questioned further in detail on variations from Lake Erie base prices, tables used, provisions of sales contracts, basis for determining Lake Erie freight rates, and vessels owned by industry members. Mr. Henderson, who continued to play the outstanding role in the questioning, expressed bewilderment after he sought unsuccessfully as to who in the industry was the price leader this year or in former years when price changes were recorded on the charts before the committee.

Henderson Mystified

"I am bewildered," Henderson said, "that a thing of such importance (price for the season) seems to come into being almost automatically each year apparently without any initial support."

Summing up the three-day session, Senator O'Mahoney said the committee "feels gratified with the manner in which you gentlemen have answered the questions." Asserting that letters introduced in the record indicate that members of the industry frequently called upon Mr. Hoyt for advice, he asked Mr. Hoyt if he would like to lay before the committee his opinion of what businessmen feel free to do in conferring among themselves. Apologetic because he was unable to stay, the Senator rushed off to the Senate chamber.

"I would prefer to submit it in writing after thinking the subject over," Mr. Hoyt told Henderson, who took over after Senator O'Mahoney left. "I would hesitate to make any extemporaneous remarks on the subject," Mr. Hoyt added.

Asked for further remarks, Mr. Hoyt pointed out that copies of sales contracts in the hands of the Department of Justice showed prices and tonnages of figures varying as much as "could be found in any other absolutely competitive industry." His opinion was that confusion had grown up in the minds of committee members because they failed to make a distinction between the base price and the cash actually received by a seller.

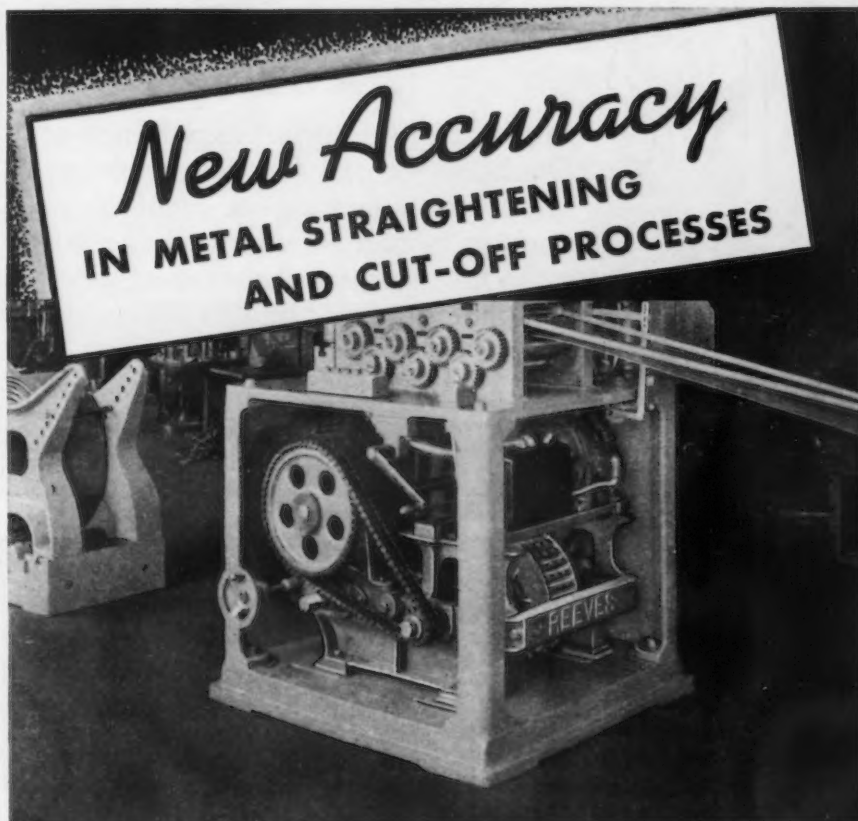
Mr. Feller, who previously explained that figures were omitted in many of the exhibits in order to safeguard information regarded as a trade secret, substantiated the Hoyt statement to the extent of saying that long-term contracts in his possession contain prices which result in different

costs to various purchasers of ore. It was not the purpose of the Justice Department, Mr. Feller said, to create the impression that prices were uniform to all buyers but merely to show that in most contracts the Lake Erie base was the standard.

Mr. Henderson then brought the ore session to a close with what he called "an impromptu running characterization."

He made the observation that: (1) the depleting nature of iron ore may

put the commodity into a different frame than a manufactured product, as suggested by John V. W. Reynders, consulting engineer representing the Commerce Department at the hearings; (2) the TNEC's job is largely a matter of matching wits because of existing laws and business customs; (3) the industry holds some price consultations and there is a certain amount of leadership in selling ore; (4) the joint ownership of steel mills and ore mines is a factor to be con-



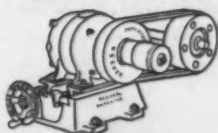
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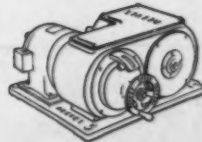
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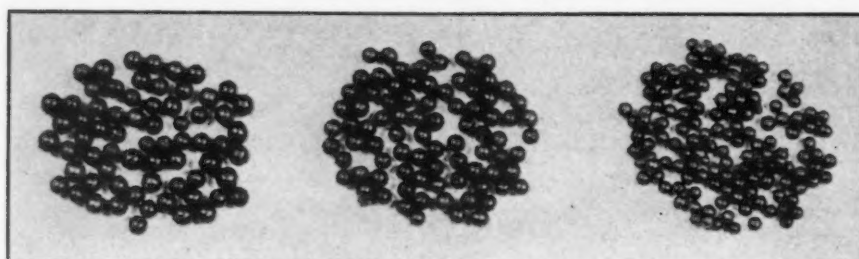
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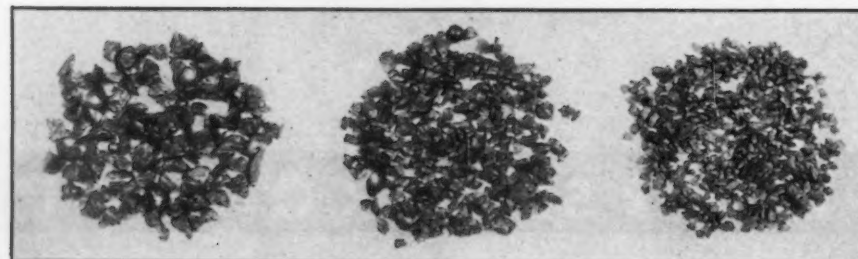


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sidered and that while the relationship may only have a psychological effect, it does have an influence on the resultant steel price; (5) within a small number of companies nearly all important outlets are combined and that the opportunities for small mines to get an outlet is reduced.

Mr. Henderson suggested that the steel people without mines might well appraise their problems as against mills having ore facilities, pointing out that Butler Brothers, for example, as indicated by the testimony, had to make a decision as to "whether they would go along with the others for the sake of expediency or whether they ought to make their own price instead of having another company make it for them."

*(Please see page 82 for later)
developments at TNEC hearing.)*

San Juan Air Base Contracts Awarded

WASHINGTON—The Navy Department's Bureau of Yards and Docks has awarded contracts totaling \$8,300,000 to the Arundel Corp., and the Consolidated Engineering Co., of Baltimore, for construction of a naval air base at San Juan, Puerto Rico, expected to be the key aviation station in the Atlantic and ultimately a submarine base.

The contract increased to \$38,000,000 contracts recently let for aviation bases in the Atlantic and Pacific. Bases in Alaska, at Sitka and Kodiak Island, will cost about \$12,740,000. Contracts also have been awarded for bases at Kanhoe Bay, T. H., \$5,714,000; Pearl Harbor, T. H., \$2,633,000; Midway Island, \$3,720,000; Johnston Island, \$1,030,000 and Palmyra Island, \$1,510,000.

Foreign Firms Seek Connections in U. S.

WASHINGTON—Indicative that the European war is diverting international markets, the Commerce Department's weekly report on foreign trade opportunities lists an unusually large number of firms desirous of establishing agency connections in this country and points out that foreign buyers are in the market for American tin plate, tools, barbed wire, machinery, galvanized iron wire, aluminum cable, copper and brass tubes and a wide variety of other products.

The department's reports in recent years have listed relatively a small number of foreign trade opportunities and the latest report containing approximately 75 openings is considered significant.

Government Steel Orders

WASHINGTON — The Public Contracts Board, Department of Labor, announced steel awards of \$11,155,674 for the week ended Oct. 28. Machinery contracts totaled \$746,083. Details follow:

Iron and Steel Products

Blaw-Knox Co., Pittsburgh, TVA, steel castings	\$15,760
Midvale Co., Philadelphia, Navy Office of Sec., gun forgings	1,879,536
Baldwin Southwark Corp., Philadelphia, Navy S & A, forgings	34,009
United States Pipe & Foundry Co., Philadelphia, WPA, pipe	10,807
Crucible Steel Co. of America, New York, War Ordnance, bar stock	17,675
Bethlehem Steel Co., Bethlehem, Pa., War Engineer, railroad rail	13,064
Duffin Iron Co., Chicago, TVA, steel armor	18,277
Henry Disston & Sons, Inc., Philadelphia, War Ordnance, armor plate	43,718
Bethlehem Steel Co., Bethlehem, Pa., War C W S, tinplate	43,821
The Newport Rolling Mill Co., Newport, Ky., Panama Canal, iron or steel sheet	10,739
Lehigh Structural Steel Co., New York, TVA, steel towers	23,622
Nashville Bridge Co., Nashville, Tenn., TVA, structural steel	20,755
Jensen Byrd Co., Spokane, Wash., Agriculture, Pulaski tools	10,445
Budd Wheel Co., Detroit, War Ordnance, shell	193,257
Standard Machinery Co., Providence, War Ordnance, thrust bearings	19,303
Winchester Repeating Arms Co., New Haven, Conn., War Ordnance, rifles	8,700,000
Colt's Patent Fire Arms Mfg. Co., Hartford, War Ordnance, pistols	68,122
The Charles Fischer Spring Co., Brooklyn, War Ordnance, springs	32,760

Non-Ferrous Metals and Alloys

The American Brass Co., Waterbury, Conn., War C W S, brass	\$17,472
Marietta Holloware & Enameling Co., Marietta, Pa., Procurement, cuspidors	Indefinite
Lewin-Mathes Co., East St. Louis, War Ordnance, copper ingots	12,700
Aluminum Co. of America, Washington, War Ordnance, magnesium	13,125

Machinery

Ingersoll-Rand Co., Washington, Panama Canal, air compressors	\$91,375
R. L. Harris, Inc., Knoxville, Tenn., TVA, air compressors	15,090
Wm. Sellers & Co., Inc., Philadelphia, Navy S & A, machine boring	39,422
Jones & Lamson Machine Co., Springfield, Vt., War Ordnance, grinding machine	11,644
Taylor-Parker Co., Inc., Norfolk, Va., Navy S & A, machine grinding	12,325
The Hendey Machine Co., Torrington, Conn., Navy S & A, lathes	19,479
Morton Mfg. Co., Muskegon Heights, Mich., Navy S & A, shaper	50,500
Stedfast & Roulston, Inc., Boston, War Ordnance, boring mills	55,548
Gisholt Machine Co., Madison, Wis., War Ordnance, turret lathes	34,503
Brown & Sharpe Mfg. Co., Providence, War Ordnance, milling machines	27,224
Warner & Swasey Co., Cleveland, War Ordnance, turret lathes	12,850
American Type Founders Sales Corp., Washington, GPO, brass figures	16,168
Food Machinery Corp., Peerless Pump Div., Los Angeles, Panama Canal, pumps	24,938
Thompson Products, Inc., Cleveland, War Air Corps, pump assembly	15,275
Copeland Refrigeration Corp., Sidney, Ohio, Navy S & A, refrigerators	11,152
Sullivan Machinery Co., New York, Panama Canal, paving breakers	14,004
Whiting Corp., Harvey, Ill., Interior, traveling cranes	167,750
American Hoist and Derrick Co., St. Paul, TVA, gantry cranes	105,431
The W. W. Sly Mfg. Co., Cleveland, Navy S & A, room, cleaning, blast	10,362
The American Laundry Machinery Co., Cincinnati, War Q M C, laundry appliances	11,041

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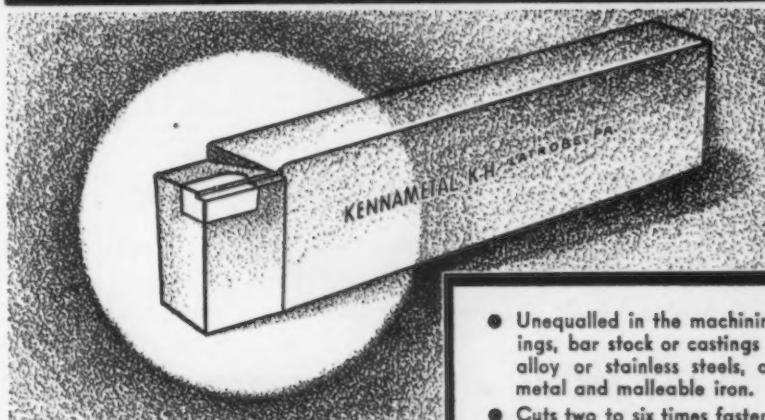
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Baldwin Says NLRB Examiner Laughed at Constitution

WASHINGTON — Gilbert H. Montague, New York, counsel for the Baldwin Locomotive Works, in a 440-page brief filed with the National Labor Relations Board, charged Trial Examiner Robert N. Denham with bias, prejudice and denial of constitutional rights in connection with a hearing on labor difficulties at the company's Eddystone, Pa., plant. Mr. Denham recommended that an injunction be issued against the company which was charged with favoring the Federation of Baldwin Employees to the disadvantage of CIO's SWOC. It was said the trial examiner "badgered" Mr. Montague "with continual distracting and unwarranted interferences and continual threats of exclusion from the hearings because respondent's counsel in the rightful performance of his duty sought to note his exceptions and the grounds of his objections." The brief says Mr. Montague told Mr. Denham: "The same derisive manner in which your honor has referred to the Constitution, which has excited laughter in the court room, is again an indication of bias and prejudice that I have referred to as preventing due process guaranteed under the Constitution."

The board also directed that a secret ballot election be held within 30 days among production and maintenance employees of the Chain Belt Co., Milwaukee, to determine whether or not they desire to be represented by Amalgamated Association of Iron, Steel & Tin Workers of North America, Lodge No. 1527, a Congress of Industrial Organizations affiliate.

NLRB Bars Dealing With AFL Affiliate

WASHINGTON—The National Labor Relations Board has ordered the Eagle-Picher Lead Co., and the Eagle-Picher Mining & Smelting Co. to withhold exclusive recognition from the AFL's Blue Card Union, or from any other union until such time as some labor organization is certified as exclusive representative of the company's employees.

An election at Kelsey-Hayes Wheel Co., Detroit, has been called by the board to permit employees to vote for or against the CIO faction of the United Automobile Workers' Union.

The Symington-Gould Corp., Rochester, N. Y., announces dissolution of its wholly-owned subsidiary, the Gould Coupler Corp. The Gould Coupler works at Depew, N. Y., will be operated in conjunction with the Rochester works.

This Week on the Assembly Line

(CONTINUED FROM PAGE 58)

straight chrome alloy. It is also commonly known that the Republic Steel Corp. is supplying most of the Chevrolet material and approximately 75 per cent of the stainless for General Motors as a whole.

Hub caps of stainless steel continue to be a live topic of conversation, at least, although further developments are indicated within the next year. Ford, as the trade generally knows, is using stainless hub caps with material 0.023 in. thick. Some exploratory work apparently is being done in the use of 0.013 in. or 0.014 in. stainless over steel backings for Chevrolet. This is a chrome nickel material.

In the metal finishing field Chevrolet takes another step for 1940 in the bonderizing of the entire body. This rustproofing process formerly was used only on fenders and sheet metal.

Chevrolet's Mechanical Changes

Refinements to the Chevrolet valve mechanism to obtain greater quietness with the overhead valve installations are brought about through several novel design features and some new production methods of particular interest. Chevrolet's first step was shortening the long push rods by $2\frac{3}{8}$ in. This design feature gives the rods greater stiffness and reduces side deflection at high speeds which might cause a humming noise.

The shorter push rod length is made possible by a new tappet which is a hollow piece made in two parts. Formerly the tappet was cup shaped, quite deep, with several inches of the push rod inserted in the tappet. The new tappets consist of a cast iron shell with a steel push rod seat brazed to the top.

In previous years the seat was located at the bottom of the tappet as an integral part of it. Finishing such a seat was difficult and it was necessary for the seat to be shaped so that in profile it was a flat angle. The new seats are made of steel with a hard, smoothly finished spherical cup shape. The push rod ends and the spherical seats are hardened by an induction heating process.

Another change in manufacturing technique is found in the cast tappet shell; the cam face is treated to provide hardness and is machined to a very smooth finish for contact with the hardened cam. The cams, incidentally, are being given one of the new chemical treatments to harden and protect the surface. Additional resistance to wear is built into the valve mechanism by hardening the tips of the valves and the rocker arm shafts. The latter is also an induction heating process.

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No Immediate Danger of Excessive Inventories, Steel Users Say

IN answer to an inquiry from THE IRON AGE, consumers of steel have written interestingly on a subject which is of growing concern to a great many people, namely, are excessive inventories of finished steel being built up? With only a few exceptions, the letters received by THE IRON AGE indicate that no such danger exists while present conditions continue. Some point out that even should the war end suddenly they would have no more than two or three months' inventory to liquidate. While all consumers have been obliged to cover their requirements by ordering farther ahead than usual, most of the steel thus ordered is for future delivery and is not yet rolled. Letters were sent to steel consumers in varied lines of manufacture, including the automotive, railroad equipment, building materials and general machinery and equipment fields—a fairly good cross-section of the metal-working industry. Some of the letters received are of such interest that they are reproduced below, with names of the writers deleted.

Farm Implement Manufacturer

The mass forward buying that has taken place since the outbreak of the European war has resulted in many perplexing problems. The writer is of the opinion that it will be almost impossible for the manufacturers to build up excessive inventories due to the fact that consumption is keeping pace with production.

The original intent of all the large buyers was to cover for their requirements as far ahead as possible; however, with the exception of a few optimists no one could foresee with any real certainty the tremendous volume that has developed during the past 30 days which has resulted in a mad scramble for parts and raw materials of all kinds.

Our problem was similar—in September we started to anticipate our needs; however, during the past 60 days we have been forced to go into the market again due to the fact that we received specifications far beyond our forecast.

We are now in a period that can be truly termed as "scrambling for materials" and regardless of the outcome of the European situation it seems to the writer that there will not be a let-down until all the large stocks which were built up dur-

ing the months of August and September are depleted.

The remarkable improvement that has taken place in the heavy goods industries and the railroads has resulted in an unusual demand for all types of parts and materials. This unexpected volume should balance stocks and eliminate any concern about large inventories being built up.

The present situation is not alarming when you take into consideration the pent-up demand that is now coming to the front; therefore the writer honestly feels that Washington should not attempt to stem the tide by worrying about large inventories because unless something unforeseen develops the problem will be to maintain adequate inventories to take care of requirements.

Bolt Manufacturer

We are one of the many smaller manufacturers consuming steel the year-round that has been caught, in common with our fellow manufacturers, in this whirlpool of demand and supply. Our inventory was admittedly low, although it was sufficient to carry us from month to month on the theory that we could get our August needs by ordering in July, our September needs by ordering in August, etc., but we did not calculate on the possibilities of not getting our October needs until possibly December, hence the shortage.

We, in common with others, have frantically importuned our sources of steel supply (of which we have about five) to help us, but they seem to be able to do little or nothing, with the consequence that we find ourselves terribly short of bars and wire which we use in our regular work. Our business is doubled, putting more pressure on our manufacturing department, and the lack of steel, of course, is placed at the purchasing agent's door.

We are not creating an excess of inventory; in fact, if we get about what we expect for the rest of 1939, we will still be short by more than 50 per cent of normal inventory. At the behest of some of our principal sources of supply, we have placed orders for 1940 delivery, "price in effect at time of shipment." This is unsatisfactory from a purchasing agent's view, and lends to an air of uncertainty.

There is undoubtedly a lot of speculative buying which is clogging up the wheels of the steel mills to the point of where we, as all-year-round buyers, must suffer while those who are stocking up against possible "war conditions" get their

tonnages, and possibly may find themselves overstocked. We think this is more true of the warehouses and wholesalers than it is of the consumer.

Steel Stamping Company

All the steel we have on order today is for definite orders now on our books and none of it is intended for surplus stock. As a matter of fact we have cut into our present stock because of the difficulty in securing prompt shipments from the mills.

We are, however, very frank to say that from information received through various steel salesmen that they are of the opinion that considerable of the tonnage on their books at the present time is a result of a desire of their purchasers to build up considerable tonnage for stock purposes.

Railroad Equipment Company

Our belief is that the large manufacturers are not stocking to any extent, but rather making commitments for just the material they may need for contracts in hand. The warehouse people may be stocking to cover what they might consider their need for the first quarter of next year, but we do not believe even with a possible recession in present conditions, there would be any excessive inventory of steel.

A Large Eastern Manufacturer

As to the possibility of excessive inventories of steel being built up, I do not believe this is the case, nor is it likely to happen. Stocks were low for a long time and when the war started, consumers and distributors of steel built up their stocks in anticipation of protracted deliveries and upturn in prices. There are some industries whose requirements even exceeded their expectations and they have had to make additional commitments.

When the war ends, if caution is used, it is not likely that many, if any, excessive inventories will be found. Even if stocks should be in excess of normal peace-time requirements, this condition will only last for a short time, as after a temporary lull, I expect an upturn in business, such as we have not experienced for many years.

A Large Ohio Company

We have not purchased steel which might build up our inventory excessively. Some tonnage has been placed for delivery during the first quarter of next year,

merely to get our name on the schedules to safeguard deliveries.

Industrial Equipment Manufacturer

We do not believe that we will have excessive material on hand after about April or May of next year, irrespective of any happenings.

With the announcement of the war during the first few days in September we had to book our requirements of all kinds of steel some six to eight months ahead, mainly from the standpoint of self protection or in order to gain a place on the schedules of the steel producers.

We felt that it was entirely unnecessary in the long run and felt then as we do now that unless there is some steel business from abroad the mills will have lots of room in their schedules during the spring months.

At the present time there are special jobs coming up that we could not protect ahead of time and we are having difficulty in placing these orders with mills which at the same time are running on material, we believe, that will not be required for several months to come.

The bookings we made were in no sense of a speculative type. We estimated our requirements on a normal basis for the first half of 1940 and booked our needs accordingly so that even should the war end, or continue on a stalemate basis as at present, the steel we have booked will be consumed in our normal channels by June 30 next year, and, of course, possibly by April 30, as it is quite difficult to estimate that far ahead very closely on what our orders for equipment and specific production schedules will be at that time.

Forgings Manufacturer

We find in our case that, due to the present rate of production, our inventories will be lower at the end of the year than at the beginning of this quarter.

Electrical Equipment Company

I have discussed with many representatives of the steel companies the possibility of buyers becoming panicky and purchasing far ahead of their immediate needs. It seems to be the opinion of most of them, in which I concur, that this is a fact with a possibility of a let-down when the mills have filled their present commitments.

Oil Equipment Maker

We foresee no danger of excessive inventory if the present situation continues for the next three months.

Automotive Equipment Manufacturer

This company has not felt disposed to stock up in steel for future needs, as we believe that the situation which arose at the time of the declaration of war by

England did not warrant conditions as they presumably existed for 30 days thereafter. Our steel purchases were normal and for immediate requirements.

However, information has been given to us by steel sales representatives visiting our firm to the effect that other companies, placing orders in large quantities, have materially delayed shipments. These same representatives have expressed the indication that the commitments as placed were not warranted for present production needs.

Our belief is that within a period of 60 or 90 days business conditions will be better interpreted and that the steel users will evidently place their orders under a more normal conditions, unless future developments in this country make a decided turn.

Steel Door Manufacturer

While there no doubt is a possibility of some speculative inventories being built up, we are not purchasing in excess of our actual requirements. Our purchasers have increased somewhat but this is due to the increased volume of business on our books. We see no immediate danger of any excess of steel inventories in our plant at the present time.

Ball Bearing Manufacturer

The policy of this corporation has always been to carry reasonable stocks of both raw material and finished and semi-finished products in order that the best possible service can be given to our customers. At the present time due to the increased volume of business, our inventories are necessarily being increased wherever possible. However, we would not say that excessive stock is being built up or would be built if it were possible to obtain unlimited raw material from our suppliers.

Automotive Parts Manufacturer

In our opinion inventories of steel at the present time have not been built up to excess. We do feel, however, that many buyers have extended their buying position much farther ahead, and that with a let-down in business volume within the next three or four months, some of these buyers might be caught with too large inventories.

In many cases we feel that the situation is somewhat similar to that which occurred in the spring of 1937 when the steel mills greatly oversold the customers' needs and thereby built up extreme excesses in inventories. The result of this, of course, was a drastic drop in steel mill rolling operations and delayed normal activities until late in 1938 or early in 1939.

Electrical Manufacturer

Our usual practice is to carry a minimum stock which is about equal to the usage over the period required for delivery—in other words, about a four to six

weeks' stock. By the middle of September, the time of deliveries had been so lengthened that we had to place orders for future shipments considerably farther ahead than we would have done normally.

We are not trying to cover ahead for more than our "past performance average" for three months which means that even if business took a tailspin, it would not take us much longer than one quarter to use up our excess inventory. At this time we already have our January and February requirements ordered. This applies only to steel and as soon as deliveries are shortened, we intend to go back to our regular practice unless the outside interference of war, laws, etc., makes it necessary to do otherwise.

A Michigan Manufacturer

To summarize our situation briefly, we have at present steel on order and on hand for our own and customers' requirements to carry us to April 1, 1940, using as a basis the current rate of production, which to us at this time is normal.

Of course, the material required for the first quarter of 1940 will not be shipped until the end of December, 1939. Under normal conditions sufficient material for one month's production would be shipped in December to take care of January production, but under existing conditions we will have enough for February and March also, or a 60-day bank.

The price structure has been the determining factor for this arrangement.

Industrial Equipment Builder

In our particular line and also due to the possible increase in the steel prices and delays on deliveries, we have found it necessary to build up an inventory equal to five to six months in order that we can protect ourselves against too much of an increase and also a possible shortage.

A Large Michigan Company

We are attempting to avoid an excess steel inventory and are only covering those requirements that actually exist. Assuming the continuance of present conditions, I do not look for any large increase in our steel inventories.

An Electrical Manufacturer

Our present inventories of steel are slightly larger than they have been in the past only in order to carry us until the steel mills can fill our orders in time for our needs.

Should the present European war end and the flow of raw materials become normal, our stock of steel and other commodities would represent only two or three months in excess of our regular requirements.

On the other hand, should the present conditions continue, naturally our inventories would have to be adjusted to take care of the changing conditions with regard to the time it will take to make delivery of our orders.

October Pig Iron Output Approaches 1929 Highs

PRODUCTION of coke pig iron in October totaled 3,627,590 gross tons, compared with 2,878,556 tons in September. On a daily basis October showed a gain of 21.9 per cent over that in September, from 95,952 tons to 117,019 tons in October, which was the highest daily rate since August, 1929, when it was 121,151 tons. The rate of operation last month was 85.9 per cent of the industry's capacity, as compared with 70.4 per cent in September.

There were 188 furnaces in blast on Nov. 1, a gain of 19 over the 169 in blast on Oct. 1. The number in blast was the highest since Nov. 1, 1929, when there were 203 furnaces operating. The 188 furnaces were producing iron at the rate of 120,565 tons on Nov. 1 in comparison with 105,525 on Oct. 1. The United States Steel Corp. blew in five furnaces, independent producers blew in 10, and four merchant stacks were blown in.

Furnaces blown in included: A Harriet furnace, Wick wire-Spencer Steel Co.; one Palmerton, New Jersey Zinc Co.; one Swede, Alan Wood Steel Co.; one Duquesne, one Edgar Thomson, one Isabella, one Farrell, one Gary, Carnegie-Illinois Steel Corp.; one Monongahela, National Tube Co.; one Aliquippa, Jones & Laughlin Steel Corp.; one Midland, Pittsburgh Crucible Steel Co.; one Monessen, Pittsburgh Steel Co.; one Cambria, Bethlehem Steel Co.; one Sharpsville, Pittsburgh Coke & Iron Co.; one Martin's Ferry, Wheeling Steel Corp.; one Federal and one Zenith, Interlake Iron Corp.; one Iroquois, Youngstown Sheet & Tube Co., and one Colorado, Colorado Fuel & Iron Co.

No furnaces were blown out or banked.

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons)		November 1		October 1	
	October (31 Days)	September (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	237,540	201,462	11	7,725	10	6,915
Other New York and Mass.	16,000	14,333	1	515	1	480
Pennsylvania:						
Lehigh Valley	80,066	59,311	5	2,585	5	2,335
Spiegeleisen	8,087	4,292	2	295	1	145
Schuylkill Valley	35,946	27,813	3	1,545	2	925
Susquehanna and Lebanon Valleys	15,273	12,190	1	495	1	405
Pittsburgh District	801,975	609,102	40	27,745	33	23,070
Ferro. and Spiegel	5,502	6,902	1	175	1	230
Shenango Valley	55,829	26,370	4	2,205	2	1,150
Western Pennsylvania ...	104,034	76,141	7	3,455	6	2,845
Ferro. and Spiegel	13,364	12,616	1	430	1	420
Maryland:						
Wheeling District	184,661	170,348	6	5,955	6	5,680
Ohio:						
Mahoning Valley	163,212	135,068	8	5,395	7	4,525
Central and Northern ...	366,525	290,615	17	11,820	17	11,550
Southern	317,653	278,324	15	10,215	15	9,330
Illinois and Indiana	57,191	45,582	5	1,845	5	1,670
Michigan and Minnesota ...	700,654	527,949	29	22,675	26	20,280
Colorado, Missouri and Utah	128,697	97,117	7	4,280	6	3,255
The South:						
Virginia	47,880	33,671	4	1,840	3	1,380
Ferromanganese			0	.....	0	.....
Kentucky	2,959	2,760	1	95	1	95
Alabama	25,733	26,593	2	830	2	885
Ferro. and Spiegel	256,690	217,225	17	8,280	17	7,865
Tennessee	2,119	2,767	1	135	1	90
Total	3,627,590	2,878,556	188	120,565	169	105,525

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese	
	Pig Iron*		1939	1938
	1939	1938	1939	1938
January	2,175,423	1,429,085	20,805	22,381
February	2,060,187	1,298,268	18,655	20,205
March	2,394,615	1,452,487	16,008	21,194
April	2,056,177	1,376,141	11,518	18,607
May	1,717,516	1,255,024	7,888	13,341
June	2,118,451	1,062,021	16,617	14,546
½ year	12,522,369	7,873,026	91,491	110,281
July	2,356,270	1,201,785	21,213	20,818
August	2,659,813	1,493,995	20,628	6,088
September	2,878,556	1,680,435	21,949	630
October	3,627,590	2,052,284	23,944	3,621
November .....	.....	2,269,983	.....	13,186
December .....	.....	2,210,728	.....	19,197
Year .....	.....	18,782,236	.....	173,791

*These totals do not include charcoal pig iron.

†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1939	1938	1937	1936	1935
January	70,175	46,100	103,597	65,351	47,656
February	73,578	46,367	107,115	62,886	57,448
March	77,246	46,854	111,596	65,816	57,098
April	68,539	45,871	113,055	80,125	55,449
May	55,404	40,485	114,104	85,432	55,713
June	70,615	35,400	103,584	86,208	51,570
½ year	69,184	43,497	108,876	74,331	54,138
July	76,009	38,767	112,866	83,686	49,041
August	85,800	48,193	116,317	87,475	56,816
September	95,952	56,015	113,679	91,010	59,216
October	117,019	66,203	93,311	96,512	63,320
November .....	.....	75,666	66,891	98,246	68,864
December .....	.....	71,314	48,075	100,485	67,950
Year .....	.....	51,458	100,305	83,658	67,556

Merchant Iron Made, Daily Rate

	Tons				
	1939	1938	1937	1936	1935
January	10,603	10,635	16,106	10,537	3,926
February	9,637	8,854	16,514	11,296	6,288
March	8,951	8,524	16,457	10,831	7,089
April	8,508	8,273	14,517	13,897	8,799
May	7,038	6,431	19,483	12,814	8,441
June	7,613	5,375	15,870	14,209	7,874
July	8,396	5,495	19,609	11,619	8,644
August	10,022	6,614	17,831	12,148	8,194
September	11,293	11,205	20,065	12,526	10,090
October	14,651	10,799	18,950	13,645	11,199
November .....	.....	13,208	15,662	14,739	12,503
December .....	.....	9,130	10,964	14,852	13,312

Sutton Sales Gain

PITTSBURGH—Sales of rolling mill straightening equipment have picked up recently with Sutton Engineering Co., whose works are located at Bellefont, Pa. Round straighteners have been sold recently to Bohn Aluminum & Brass Corp., Detroit; Jones & Laughlin Steel Corp., Aliquippa, Pa.; Dow Chemical Co., Midland, Mich.; Wheatland Tube Co., Wheatland, Pa. The company has also booked pipe straightening machinery for Bethlehem Steel Co., Sparrows Point, Md.; Spang Chalfant division, National Supply Co., Etna, Pa.; Republic Steel Corp., Youngstown. Rotary Electric Steel Co., Detroit, recently bought a heavy-duty sizing, straightening and polishing machine.

Vacations with Pay for 12,000

SANTA MONICA, CAL.—A mass vacation with pay for 12,000 employees of Douglas Aircraft Co. has been announced by Donald W. Douglas, president.

Priority Committee Set Up to Ration Foreign and U. S. Orders

WASHINGTON — Developments resulting directly or indirectly from the European war set a rapid pace last week as Congress adjourned after having repealed the arms embargo. Other developments included establishment of a Government priority committee to insure a minimum of conflict between European war orders and domestic purchases, announcement of plans for a new \$1,300,000,000 naval expansion program, and a Labor Department warning that employees need not expect a boost in employment and wages in the months ahead as occurred during the World War.

Revision of the neutrality law meant, of course, that shipments of all commodities previously prohibited, including arms, ammunition and other so-called implements of war, are hereafter permitted, provided purchasing countries pay cash and carry the goods away in their own bottoms. President Roosevelt invoked the "cash and carry" provisions of the neutrality law on Saturday and by proclamation established a "combat zone" in belligerent waters from which American vessels are barred.

The prohibited area extends from a point south of Bergen, Norway, to the north coast of Spain, including in the forbidden zone, Ireland, Denmark, Holland, Belgium, Sweden and the Baltic Sea, but exempting the west coast of Spain. American ships, aircraft and citizens are specifically banned from these areas.

Priority Committee Active

Although the Government priority committee actually has been in existence since last summer and already has been in touch with foreign governments, its creation had not previously been announced. Established as an inter-departmental group identified as the clearance committee of the Army and Navy Munitions Board, the committee, headed by Colonel Charles Hines, executive officer, will have the job of adequately distributing \$500,000,000 worth of expected European war orders so that a minimum of interference will be encountered in domestic purchases for national defense. This country is estimated to be spending at the rate of \$2,000,000,000, a year for defense requirements.

Government officials experienced in keeping supplies moving and plants op-

erating in 1917-1918 are understood to have been assisting the committee. Estimates vary but some officials expect that allied purchases may reach \$2,000,000,000 in the next 10 months. Their off-hand guess is that orders for planes, engines and parts, gunfire control mechanisms, small arms and ammunition will constitute the bulk of the European orders.

25 Per Cent Naval Tonnage Increase

Chairman Vinson of the House Naval Affairs Committee revealed the contemplated naval expansion program, estimating that the construction of 95 additional ships and 2400 airplanes are planned under a \$1,300,000,000 expansion. Briefly, the program, representing 25 per cent increase in tonnage, or 5 per cent greater than that provided under the naval expansion act of 1937, calls for the construction of three aircraft carriers, eight cruisers, 52 destroyers, 32 submarines and 31 auxiliary vessels, making a total of 126 new ships in the combatant and non-combatant category.

As outlined by Chairman Vinson, the plans are based on the assumption that the major part of the construction could be completed in three to four

10% Wage Increase for York Ice Machinery

J. H. VOGEL, recently appointed general works manager of the York Ice Machinery Corp. has just announced a 10 per cent increase in the hourly wage rate and a 40-hr. week for factory employees in the corporation's plants at York, Pa., as a result of an agreement signed jointly by the management and factory employee representatives.

Minimum Wage Hearing For Cast Iron Pipe

WASHINGTON—The Labor Department's Public Contracts Board has called a hearing for Nov. 10 to take testimony on which it expects to base recommendations for minimum wages in the cast iron pressure pipe industry. The board operates under the Walsh-Healey Public Contracts Act and recommends minimum wages for firms doing government business.

years but it was noted that "special efforts" were recognized as being necessary in working toward that end. Representative Vinson said that Congress would be asked to repeal the present provision setting up the 50-50 ratio for dividing construction between navy and private yards and that the Secretary of Navy would be permitted to advance to contractors up to 30 per cent of the cost of any ship. The committee expects to start public hearings on a measure, already drafted, beginning Jan. 8.

Throwing cold water on any expectations that war conditions in Europe will mean substantial increases in jobs and higher wages, the Labor Department's Bureau of Labor Statistics said there probably will be a tendency toward "rising prices and increased employment" but pointed to a dissimilarity between conditions today and in 1914. If the war continues, however, for a considerable period, the Bureau observed, "certain basic resemblances to the World War are apparent."

It emphasized, however, that a reserve of unemployed workers are available, that "improved machines and techniques" are ready to vastly increase the productivity of labor, and added that "it is unsafe to assume that war orders will now have an effect on employment and on wages analogous to the effects of the World War."

Australia's Machinery Import Duty Is 15%

WASHINGTON—Australia, taking steps to stimulate its shipbuilding industry, plans to set aside \$50,000 annually to grant a bounty on ships between 100 and 1500 tons. Also, according to a report received by the Commerce Department, machinery, boilers, and auxiliaries will be admitted duty free from Great Britain, with a duty of 15 per cent on foreign materials.

Pittsburgh Welding Course

PITTSBURGH — A special eight-weeks' course in welding technique and inspection intended to round out this city's new welding code which permits welded construction of buildings in Pittsburgh, has been started by the city for its Bureau of Building Inspectors. Sessions are being held at the East Pittsburgh works of Westinghouse Electric & Mfg. Co.

INDUSTRIAL NEWS FROM CANADA

Canadian Steel Companies Not Yet Booking First Quarter Orders

TORONTO — Companies associated with the steel industry are making heavy expenditures on plant improvements and installing new equipment preparatory to handling war contracts. According to information obtained from leading steel interests, orders for munitions, shells, etc., will be making their appearance almost immediately. Already contracts for clothing, and equipment for the troops have been awarded, and the survey has been completed preliminary to awards to the metal-working trades. The repeal of the United States arms embargo is expected to have a stimulating effect on industrial activities in Canada, as well as furnishing millions of dollars in business to companies across the border. It also is expected to be a factor in speeding up war contracts in Canada. Shipment of engines into Canada will stimulate airplane production in this country. To a large extent provision has been made for financing these new contracts and it is estimated that there will be about \$2,000,000,000 available for British and Canadian purchases.

Domestic demand for iron and steel is not attracting any special attention in the Canadian markets, largely due to the fact that mills already are booked almost to capacity for this quarter and are not taking 1940 business. Imports from the United States have jumped sharply during the past two months and there are indications that much greater call will be made on American plants to furnish materials for the proposed shipbuilding program.

The automotive industry is preparing for increased production of trucks and other vehicles for war purposes. It is reported that some 4000 motor chassis for construction of army vehicles for the Australian Government will be ordered from Canadian companies.

While proposals were broached several weeks ago regarding curtailment of construction programs for federal, provincial and municipal governments, it is reported now that several large projects are to be undertaken. The Toronto City Council is considering

construction of sewage disposal works estimated to cost between \$7,000,000 and \$10,000,000. Building trades are running on high operating schedules on industrial plants, additions, commercial buildings, houses, bridges, etc. Dominion Bridge Co., Montreal, has been awarded contract for structural steel for superstructure for viaduct across Jacques Cartier River near Donnacona, Que., at cost of \$700,000.

Steel Buying in Large Volume

Officials of Steel Co. of Canada, Ltd., Hamilton, Ont., announce that shipments during the third quarter gained steadily in comparison with the previous year and by September reached record proportions, and during October operations were maintained at full capacity. Profits for the 10 months ending with October were higher than in the corresponding period of 1938 despite the fact that prices were below the average for 1938. The increase in profit was due to the heavy bookings since the beginning of September, with sales almost exclusively confined to regular products. This upswing in business, together with prospective greatly increased demand on the company's works to supply steel for war needs, caused officials to immediately proceed with installation of a new 150-ton open hearth furnace to attain additional output of ingots. This new furnace will provide an increase of 12½ per cent in production capacity. The official report states that shipments during the third quarter gained steadily in comparison with the previous year and the surge of buying that followed the declaration of war raised the volume of tonnage booked to proportions that compelled withdrawal from the market in many lines. This, the report states, was the only alternative if the company was to follow its policy of avoiding price advances as far as possible. Already higher costs of materials and supplies, as well as exchange, have affected costs in an upward direction. Shipments during recent months have exceeded consumption due to heavy purchases in anticipation of future needs.

Announcement is made that Domin-

ion Steel & Coal Corp., Sydney, N. S., is rounding out its production activities with plans under way for further expansion. In addition to installation of two mixer furnaces at a cost of \$1,000,000 this year the by-products equipment is to be enlarged considerably. Early next year the company will install additional equipment in its by-products division, now under construction by the Koppers Co., Pittsburgh, to be connected with coke ovens.

Dominion Steel continues to operate its steel plant to capacity with no let-up of the present rate in sight. The company has been successful in finding a market for its Wabana iron ore, despite loss of the German market, which has been taking some 1,000,000 tons per year. This year the company's contract with Germany was completed before the outbreak of war. Since that time the British market and other sources have absorbed the surplus Wabana production and it is believed these sources will take all the iron ore available in the future.

Canadian Industrial Activities Increasing

Fairchild Aircraft, Ltd., has awarded general contract to Sutherland Construction Co., Montreal, for addition to assembly plant at Longueuil, Que.

MacKinnon Steel Corp., Industrial Street, Sherbrooke, Que., will start work immediately on plant addition.

L. A. Young Industries, Ltd., 187 Geary Avenue, Toronto, subsidiary of Young Spring & Wire Corp., Detroit, manufacturer of spring and wire products, has awarded construction contract to R. J. Hibbs, for erection of a plant on a five-acre site at Leaside.

Welland Valve Mfg. Co., 50 Welland Street, West, Hamilton, Ont., has awarded contract for \$50,000 plant addition.

Aluminum Co. of Canada, Ltd., 1010 St. Catharine Street, West, Montreal, has awarded additional contracts in connection with \$4,500,000 plant under construction at Kingston, Ont. Anglin-Norcross, Ltd., 982 Sherbrooke Street, East, Montreal, has general contract.

Hayes Steel Products, Ltd., Merriton, Ont., has let general contract to Newman Brothers, St. Catharines,

Ont., for one story, 50 by 200 ft., plant addition.

Faymar Porcupine Gold Mines, Ltd., Suth Porcupine, Ont., has let contract to Canadian Comstock Co., Ltd., 80 King Street West, Toronto, for construction of mine buildings, including 250 ton mill unit to cost \$325,000.

Canadian Industries, Ltd., has let general contract to Allan Construction Co., for \$30,000 plant addition to plant on Sandwich Street, Windsor, Ont.

Granby Consolidated Mining, Smelting & Power Co., is contemplating erection of a copper smelter in British Columbia, according to A. S. Bailie, vice-president. The company's smelter policy will depend largely on whether the Japanese renew their contract for the entire output of Granby's copper concentrates and whether the Canadian Government continues to license the export. Present contracts run to July, 1940.

Canadian Buying in U. S. Expected Soon

TORONTO—According to information from Ottawa, commissions and purchasing boards acting for the Canadian and British governments, will place heavy orders in the United States for war supplies, now that the revised Neutrality Act has become law. It is reported that Canada plans the immediate purchase of between 1200 and 1500 airplanes for the British Empire air plan for training purposes. It also is stated that the British purchasing mission will move to New York to do some major ordering from that center.

The repeal of the arms embargo by the Washington government, however, does not mean that Great Britain will curtail purchases in Canada. According to one official "The Canadian position remains unaffected by the repeal of the United States arms embargo. There never was the slightest intention of using Canada as a jumping off ground."

It also is stated that credits are obtainable in Canada which will be a further aid to British purchases in this country.

A statement regarding the plans of the British purchasing mission is expected next week. As yet the mission has not received from England a schedule of the proposed purchases in the United States. Because of the high pressure under which British Government officials are working at home, and the slow development of

the war to the stage where it will be eating up materials and supplies to the extent normally anticipated, detailed plans for the setting up of replacement supplies have not been completed.

Already, by repatriation of Canadian securities held in England, an initial credit of \$91,000,000 is being set up for British purchases in Canada for war supplies, raw materials, etc. It is assumed that the British Government, by acquiring United States securities held by investors resident in Great Britain, will finance American cash-and-carry purchases in the same manner. It is estimated that United States securities held in Britain exceed \$2,000,000,000.

420,000,000 lb. Copper Bought in Canada By Great Britain

TORONTO—An agreement entered into with Canadian copper producers assures the British and Canadian governments of the full resources of the Canadian base metal industry and the supply of these materials at prices under those prevailing in the open world markets. The arrangement between the British Government and Canadian producers was concluded during the week and the contracts call for approximately 80 per cent of Canada's production of copper. While the price at which the red metal will be supplied is not given, it is said to be slightly better than 10c. per lb. It is understood that there may be periodical revisions in prices.

Under the terms of the agreement Canadian copper will be delivered at shipside Canadian Atlantic ports. The British Government assumes responsibility for the providing of boats and war risks. The Canadian companies also are freed from the expense of maintaining insurance on stocks abroad. Canadian copper producers that have their material finished in the United States will receive some additional compensation to offset the additional cost when refining settlement is made in U. S. funds, which are at a premium of 10 per cent.

The arrangement which takes some 420,000,000 lb. of copper from Canada is not on a definite delivery basis, but arranges that each company involved shall deliver a certain amount within a year's time. None of the companies are tied down to a time limit, but they can supply the given quota in a little more or less than a year.

Each company signed the agreement separately. Following is the amount of copper to be supplied by the various producers in pounds:

International Nickel Co.	237,700,000
Noranda Mines	69,700,000
Hudson Bay Mining & Smelting Co.	50,700,000
Sherritt Gordon Mines	23,800,000
Waltre Amulet Mines	23,800,000
Aldermac Mines	7,900,000
Normetal Mines	6,400,000

The only Canadian copper producers not in the scheme are Falconbridge Nickel Mines, which has its refinery in Norway and already has entered into an agreement with British copper consumers; Granby Consolidated and Britannia Mines, the latter two being British Columbia companies.

Those in the agreement have production possibilities of 525,000,000 lb. of copper per year, of this total 105,000,000 lb. is for domestic consumption, based on 1938 figures.

Brazil Gives Plane Order To Boeing Subsidiary

EXPORT of a fleet of primary training airplanes costing approximately \$300,000 will be begun by Stearman Aircraft Division of Boeing Airplane Co. early in the spring of 1940 for the Brazilian Army Air Corps. The contract, validated a few days ago, has been announced by J. E. Schaefer, general manager of the Stearman Division and vice-president of the Boeing Co. This is the second sizable order Stearman has received from Brazil in the past few years.

In addition, the United States War Department recently announced the award of a contract amounting to \$2,843,405 for additional Stearman primary trainers for the U. S. Army Air Corps.

Monsanto to Build Plastics Research Laboratory

CONSTRUCTION of a new plastics research laboratory in Springfield, Mass., by Monsanto Chemical Co. is announced by J. C. Brooks, vice-president in charge of the plastics division. The new building, designed to house the company's research staff and laboratory facilities, will be the first structure at the Springfield plant designed exclusively for research activity.

The laboratory will give Monsanto plastics division research facilities to continue work which has led to the development of new type of plastics.

Output of Steel by Products in the Third Quarter

THE American Iron and Steel Institute's report for the third quarter shows that 7,452,974 gross tons of semi-finished and finished steel was produced for sale in

that period, not including the steel for members of the industry for further conversion, which amounted to 845,591 tons. Detailed figures are shown in the table below.

AMERICAN IRON AND STEEL INSTITUTE											
Capacity and Production for Sale of Iron and Steel Products											
Third Quarter - 1939											
	Number of companies	Items	Annual Capacity Gross tons	PRODUCTION FOR SALE—GROSS TONS							
				Current Quarter				To Date (9 Months - 1939)			
				Total	Per cent of capacity	Shipments		Total	Per Cent of capacity	Shipments	
						Export	To members of the industry for conversion into further finished products			Export	To members of the industry for conversion into further finished products
Ingot, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	716,003	xxx	49,010	470,626	1,815,841	xxx	81,972	1,205,456
Heavy structural shapes	8	2	4,796,800	561,057	46.8	29,082	-	1,494,270	41.5	67,544	xxxxxxx
Steel piling	4	3	309,300	48,520	62.7	4,146	-	110,273	47.5	7,438	xxxxxxx
Plater—Sheared and Universal	19	4	5,828,310	565,074	38.8	50,397	4,136	1,572,531	36.0	160,354	11,181
Skelp	7	5	xxxxxxx	158,173	xxx	24,541	98,140	347,807	xxx	26,952	238,594
Rails—Standard (over 60 lbs.)	4	6	3,395,300	164,556	19.4	1,202	-	796,224	31.3	7,695	xxxxxxx
Light (60 lbs. and under)	6	7	418,500	17,508	16.7	1,028	-	51,398	16.4	14,276	xxxxxxx
All other (Incl. girder, guard, etc.)	2	8	105,000	5,670	21.6	1,070	-	19,783	25.1	2,437	xxxxxxx
Splice bar and tie plates	14	9	1,290,550	63,875	19.8	1,056	-	300,955	31.1	3,739	xxxxxxx
Bars—Merchant	35	10	xxxxxxx	763,286	xxx	35,069	76,040	2,029,214	xxx	75,126	204,784
Concrete reinforcing—New billet	14	11	xxxxxxx	240,102	xxx	14,164	-	650,520	xxx	41,536	xxxxxxx
Rerolling	19	12	xxxxxxx	40,835	xxx	1,545	-	115,298	xxx	6,081	xxxxxxx
Cold finished—Carbon	18	13	xxxxxxx	124,003	xxx	2,055	-	332,661	xxx	4,393	xxxxxxx
Alloy—Hot rolled	14	14	xxxxxxx	165,486	xxx	1,598	15,645	434,441	xxx	12,146	38,248
Cold finished	14	15	xxxxxxx	13,914	xxx	42	-	39,210	xxx	169	xxxxxxx
Hoops and baling bands	5	16	xxxxxxx	17,364	xxx	381	-	44,913	xxx	725	xxxxxxx
TOTAL BARS	53	17	11,570,970	1,364,990	47.2	94,854	91,685	3,653,257	42.1	140,176	243,032
Tool steel bars (rolled and forged)	15	18	94,160	10,317	43.8	1,429	-	26,625	37.7	2,555	xxxxxxx
Pipe and tube—B. W.	15	19	1,625,800	217,635	53.6	7,381	-	563,259	46.2	20,634	xxxxxxx
L. W.	20	20	1,316,580	82,429	25.0	2,741	-	215,592	21.8	7,327	xxxxxxx
Electric weld	4	21	615,000	78,538	51.1	1,596	-	160,357	34.8	5,151	xxxxxxx
Seamless	15	22	2,968,900	398,662	53.7	23,815	-	981,461	44.1	57,038	xxxxxxx
Conduit	6	23	153,670	15,244	39.7	461	-	42,778	37.1	1,307	xxxxxxx
Mechanical Tubing	5	24	182,100	21,349	46.9	188	-	65,432	47.9	2,091	xxxxxxx
Wire rods	19	25	xxxxxxx	174,492	xxx	5,079	55,536	452,846	xxx	18,719	147,721
Wire—Drawn	38	26	1,970,195	297,731	60.4	12,909	2,114	813,289	55.0	41,026	8,923
Nails and staples	19	27	1,080,760	160,588	59.4	6,490	-	429,342	53.0	18,497	xxxxxxx
Barbed and twisted	16	28	428,075	45,791	42.8	13,134	-	145,929	45.5	33,682	xxxxxxx
Woven wire fence	15	29	695,330	48,042	27.6	438	-	182,795	35.1	1,332	xxxxxxx
Bale ties	11	30	110,680	17,347	62.7	11	-	41,566	50.1	67	xxxxxxx
All other wire products	5	31	24,380	1,138	18.7	4	-	3,360	18.4	16	xxxxxxx
Fence posts	12	32	134,700	9,890	29.4	439	-	37,942	37.6	1,033	xxxxxxx
Black plate	12	33	462,815	89,771	77.6	2,230	27,842	246,679	71.1	5,063	83,299
Tin plate—Hot rolled	10	34	1,527,360	129,054	33.8	17,590	-	373,793	32.6	57,131	xxxxxxx
Cold reduced	10	35	1,956,200	458,173	94.7	55,961	-	1,191,241	82.0	121,997	xxxxxxx
Sheets—Hot rolled	25	36	xxxxxxx	1,043,410	xxx	55,885	49,287	2,759,658	xxx	163,449	113,532
Galvanized	16	37	xxxxxxx	335,325	xxx	27,314	-	865,645	xxx	74,127	xxxxxxx
Cold rolled	18	38	xxxxxxx	389,422	xxx	18,809	-	1,174,467	xxx	73,904	xxxxxxx
All other	16	39	xxxxxxx	98,268	xxx	5,760	-	286,963	xxx	12,416	xxxxxxx
TOTAL SHEETS	27	40	11,374,065	1,866,425	65.6	107,768	49,287	5,086,733	59.6	323,896	113,532
Strip—Hot rolled	24	41	3,209,300	292,478	36.5	9,748	46,225	759,618	31.6	23,624	109,210
Cold rolled	36	42	1,160,910	152,222	52.4	3,136	-	398,591	45.8	7,327	xxxxxxx
Wheels (car, rolled steel)	5	43	380,320	27,555	29.0	3,630	-	77,676	27.2	4,309	xxxxxxx
Axles	5	44	425,900	12,918	12.1	510	-	32,362	10.1	3,834	xxxxxxx
Track spikes	11	45	300,100	22,865	30.5	468	-	73,835	32.8	1,385	xxxxxxx
All other	4	46	9,450	2,485	105.2	15	-	7,313	103.2	101	xxxxxxx
TOTAL STEEL PRODUCTS	135	47	xxxxxxx	8,298,565	xxx	493,557	845,591	22,572,553	xxx	1,271,325	2,160,950
Estimated total steel finishing capacity based on a yield from ingots of 70.0 %				48,514,000	xxxxxxx	61.4	xxxxx	xxxxxxx	56.1	xxxxxxx	xxxxxxx
Pig iron, ferro manganese and spiegel	28	49	xxxxxxx	1,043,229	xxx	53,775	273,106	2,667,218	xxx	75,674	671,185
Ingot moulds	4	50	xxxxxxx	90,258	xxx	479	-	208,663	xxx	808	xxxxxxx
Bars	9	51	147,200	7,711	21.0	31	575	20,898	18.9	87	1,240
Pipe and tubes	3	52	97,730	9,999	40.9	223	-	29,644	40.4	527	xxxxxxx
All other	2	53	63,560	4,153	26.1	1,005	1,325	9,862	20.7	1,636	3,567
TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	250,530	21,863	34.9	1,259	1,900	60,404	32.1	2,250	4,807

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current quarter 7,452,974 G.T.: 61.4 % of Finishing Capacity.
To date 20,411,603 G.T.: 56.1 % of Finishing Capacity.
The above tonnages represent 70.0 % of the ingots produced by companies whose products are included above.

Inland Not Booking Orders for Export

INLAND STEEL CO. reports for the third quarter of 1939 a net profit of \$2,587,750, compared with a profit of \$1,098,245 for the corresponding period of 1938, while the company's profit for the 12 months ended Sept. 30 totaled \$8,132,595. A common stock dividend of \$1 was declared payable Dec. 1 to shares of record Nov. 14.

The Inland company's production and shipments during October were the largest in the company's history and current operations are above 100 per cent of capacity, a rate likely to continue through 1939. Officials said:

"The company has made every possible effort to satisfy the requirements of its regular customers, the vast majority of whom are located in the Central West. Although the demand from foreign countries has been very heavy since the outbreak of the European War, we have not quoted on such business and no export tonnage is being booked at present.

"Furthermore, for the past six weeks sales to domestic customers for future deliveries have been made in relation to prior purchases and this practice is being maintained."

Pittsburgh Steel Net For Quarter \$85,093

PITTSBURGH STEEL CO., Pittsburgh, reports net income of \$85,093 for the quarter ended Sept. 30, compared with net loss of \$274,132 for the corresponding 1938 period. For the nine-month period ended Sept. 30, the company reports net loss of \$524,681.

New Aluminum Foil Plant for Kentucky

PITTSBURGH—Cochran Foil Co., Louisville, Ky., a newly formed organization, has purchased a number of foil mills and auxiliary equipment from Lewis Foundry & Machine division, Blaw-Knox Co., to be used in the progressive rolling of strip aluminum to foil. It is said the cold rolling two-high mills will form the nucleus of a new foil plant with facilities to produce in its initial stage, several million pounds of aluminum foil per year.

Aluminum strip up to 27½ in. wide and from 0.040 to 0.062 in. gage will

be reduced to a foil thickness as low as 0.00025 in. Delivery speed on the foil rolling will go up to 600 ft. per min.

Each mill, a unit on its own baseplate, will be individually driven from a Ward-Leanrod variable voltage control, and with automatic acceleration and deceleration. A self-contained power plant will house the control panels and motor generator sets for each mill, all fully instrumented for selective and automatic control.

U. S. Steel Products Takes New Name

THE name of the United States Steel Products Co., United States Steel Corp. export subsidiary, has been changed to United States Steel Export Co. By substituting the word Export for the word Products, it is felt that the company name will indicate more clearly the business carried on by the company.

The United States Steel Export Co.'s main office is located at 30 Church Street, New York.

Ore Association Offers Story of Great Lakes

CLEVELAND—A geological story of the Great Lakes, titled, "Ne-Saw-Je-Won," which means "the waters that run down from Lake Superior to the Sea," is now available to the general public through M. D. Harbaugh, secretary, Lake Superior Iron Ore Association, Hanna Building, Cleveland. Originally it was printed in book form for private distribution. The author is Helen M. Martin, research geologist of the Michigan Geological Survey.

Armco Plants Reach Capacity; Dividend Voted

AMERICAN ROLLING MILL CO. has declared a dividend of \$1.50 per share on account of dividends in arrears upon the 4½ per cent cumulative preferred stock, payable Dec. 15, to stockholders of record Nov. 15. The company reported earnings of \$600,793.57 for the third quarter of 1939, compared with a loss of \$556,994.77 for the third quarter of 1938.

Calvin Verity, executive vice-president, said the Armco plants were scheduled to operate at practical capacity for the remainder of the year.

SWOC Makes Wage Demand on Bethlehem

PITTSBURGH—Committees representing union steel workers affiliated with the SWOC have called on local officials at each Bethlehem Steel Co. plant to present the union demand that the company institute the \$5-a-day minimum wage.

Plant executives were visited at Johnstown, Lackawanna, N. Y., Sparrows Point, Md., Bethlehem, Pottstown, Lebanon, Steelton, Rankin, Leetsdale and Johnstown, Pa., Seattle, Los Angeles and San Francisco.

The request said advancing commodity prices make higher wages imperative.

National Steel Third Quarter Earnings \$2,903,881

NATIONAL STEEL CORP. reports net earnings, after all charges, for the quarter ended Sept. 30, 1939, of \$2,903,881, equal to \$1.32 per share on 2,199,067 outstanding shares of capital stock. This compares with net earnings in the third quarter of 1938 of \$1,813,996, equal to 84 cents per share on 2,168,117 shares then outstanding. Net earnings for the first nine months of 1939 were \$7,289,304, equal to \$3.31 per share, comparing with \$3,908,495, equal to \$1.80 per share earned in the same period of 1938.

Pittsburgh Index Rises

PITTSBURGH—The pronounced upward march in business in this district which began about the middle of May continued last week, according to the Bureau of Business Research, University of Pittsburgh. After allowance for the usual seasonal changes, the bureau's index of general business advanced from 120.9 in the week ended Oct. 21 to 124.5 last week (Oct. 28); it was 78.5 in the week ended Oct. 29 a year ago and 92.6 in the same week of 1937.

New Coal Washing Plant

PITTSBURGH—Koppers Rheolaveur Co. has been awarded a contract for approximately \$160,000 by the Koppers Coal Co., to provide the first unit of a coal washing plant at the company's new mine at Kopperston, Wyoming County, W. Va. The unit consists of a Menzies cone separator, 10 ft. in diameter and capable of washing approximately 175 tons of 3x¾ in. coal per hr.

... THE NEWS IN BRIEF ...

Chrysler labor troubles will prevent automobile industry from making fourth quarter record.—Page 56.

Chevrolet is increasing use of stainless steel on cars.—Page 58.

TNEC prepares to act as watchdog on prices of commodities such as steel.—Page 60.

Zinc ore exports exempted from export licensing requirements.—Page 64.

Contracts for \$8,300,000 airplane-submarine base in Puerto Rico awarded by Navy Department.—Page 76.

Foreign firms seek trade connections in U. S.—Page 76.

Steel products awards by Government for week ended Oct. 28 total \$11,155,674.—Page 77.

Labor Board orders Eagle-Picher Lead Co. to withhold exclusive recognition from AFL's Blue Card union.—Page 78.

Baldwin Locomotive attorney holds NLRB examiner violated company's constitutional rights.—Page 78.

Canadian steel companies not yet booking first quarter orders.—Page 79.

No immediate danger of excessive inventories, steel users say.—Page 79A.

October pig iron output approaches 1929 highs.—Page 79C.

Douglas Aircraft Co. to grant vacations with pay to 12,000.—Page 79C.

Sales of rolling mill straightening equipment pick up for Sutton Engineering Co., Bellefonte, Pa.—Page 79C.

Pittsburgh Welding course started at Westinghouse Electric & Mfg. Co. works.—Page 79D.

Government priority committee will harmonize foreign war orders and U. S. demand.—Page 79D.

Australia places 15 per cent duty on machinery imports, except from Britain.—Page 79D.

Labor Department orders minimum wage hearing for cast iron pressure pipe industry.—Page 79D.

Canadian industrial activities increasing.—Page 79E.

Canadian buying in U. S. expected soon.—Page 79F.

Brazil buys \$300,000 fleet of training planes from Boeing division.—Page 79F.

420,000,000 lb. copper bought in Canada by Great Britain.—Page 79F.

Construction of new plastics research laboratory is begun by Monsanto Chemical Co.—Page 79F.

National Steel Corp.'s third quarter earnings \$2,903,881 against \$1,813,996 in corresponding period of 1938.—Page 79H.

SWOC makes wage demand on Bethlehem Steel Co., cites higher commodity prices.—Page 79H.

Lake Superior Ore Association distributes book giving geological history of the Great Lakes.—Page 79H.

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MEETINGS

- Nov. 10—Eastern States Blast Furnace and Coke Oven Association, Cleveland.
- Nov. 15 and 16—National Founders Association, New York.
- Nov. 15 and 16—American Management Association, Chicago.
- Dec. 4 to 8—American Society of Mechanical Engineers, Philadelphia.

Pittsburgh Steel Co. reports net income of \$85,093 for third quarter compared with net loss of \$274,132 for like period of 1938.—Page 79H.

University of Pittsburgh business index rises to 124.5.—Page 79H.

Cochran Foil Co. buys equipment for rolling aluminum foil at Louisville, Ky.—Page 79H.

Koppers Rheolaveur Co. gets \$160,000 coal washing plant contract.—Page 79H.

U. S. Steel Corp. subsidiary changes its name to United States Steel Export Co.—Page 79H.

Armco mills at capacity; company votes \$1.50 back dividend on preferred stock.—Page 79H.

Inland Steel Co. not booking export orders, operates mills above theoretical capacity.—Page 79H.

CIO files charges of Wagner Act violation against Western Pipe & Steel Co.—Page 86.

October awards for heavy engineering construction projects 17 per cent above September total.—Page 86.

Pullman Standard reopens car plant closed two years.—Page 94.

Substantial increase in British steel prices expected Nov. 1 as consequence of rise in raw materials.—Page 94.

October output of steel ingots, amounting to 5,393,821 gross tons, is highest on record.—Page 95.

Drop in imports increases toy plant operations.—Page 86.

Wheeling Steel Corp. buys Fretz-Moon continuous butt weld pipe mill.—Page 104.

Machine tool selling quieter in most sections, except in the East where all-time records are being broken. Deliveries still becoming extended. Foreign buying, lagging behind domestic orders, expected to spurt following amendment of Neutrality Act.—Page 104.

HOW TO GET MORE GALLONS AT LESS COST!

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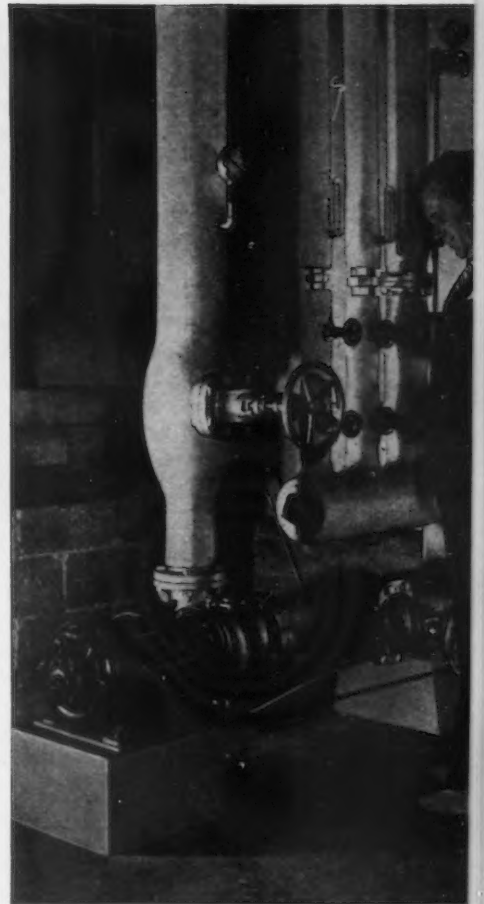
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Fairless Defends Steel Pricing System Before TNEC

WASHINGTON—Described as the "focal point" by A. B. Feller, in charge of the Department of Justice's steel inquiry before the Temporary National Economic Committee, examination of the general price policy of the industry was begun Monday afternoon. The first steel witnesses were Benjamin F. Fairless, president, and H. L. Hughes, vice-president, of the United States Steel Corp., and Robert Gregg, president, Tennessee Coal, Iron & Railroad Co., a corporation subsidiary. This marked the second phase of the investigation and followed a hearing of witnesses from the iron ore industry last week.

As the hearing proceeds, it becomes clear that the Department of Justice is emphasizing prices to determine in its own mind whether they are responsive to the law of competition. While both the ore and steel interests insist that competition is keen, the department is giving close attention to the joint stock ownership of steel and ore properties as well as to the price structure. The bearing of ore prices on the steel structure has been dwelt upon in connection with the declaration of Assistant Attorney General Thurman W. Arnold that the primary factors to be explored center around charges of concentrated power and lack of competition.

Taylor Attends Hearing

Voluminous rebuttal testimony has been and will be submitted by steel executives to counter these old charges. Seldom has such an array of leaders from the steel industry been summoned before a Government body to present its case as those who have been and will be called before the TNEC.

Among those who were present at the hearing in addition to the initial Steel Corporation and TCI witnesses when it was resumed were Myron C. Taylor, former chairman; Edward R. Stettinius, Jr., chairman; William Beye, vice-president; Nathan L. Miller, general counsel, and Irving L. Olds, director, of United States Steel Corp. Among executives of the Bethlehem Steel Co., were E. G. Grace, president; Paul Mackall, vice-president in charge of sales; Robert E. McMath, vice-president and secretary; F. A. Shick, vice-president and controller, and Hoyt A. Moore general counsel.

Before the committee sits a large, sturdy stainless steel easel, on which scores of exhibits are placed. It is the gift of the United States Steel, and was put into service as the steel price hearing began.

Mr. Fairless, the first steel witness to be questioned, told the committee that if it takes into consideration that the base price of steel always reflects a reasonable price it is easier to understand why a reduction in the price does not have any material effect upon stimulating business. He conceded that in some industries a reduction in price tends to stimulate demand but he pointed out that because of the peculiar nature of the steel industry, the same thing does not hold true.

Base Price Always Fair

Questioned by Mr. Henderson if that view has not been a prevailing one in the steel industry for many years, Mr. Fairless answered in the affirmative, explaining that the base price represents a fair one.

"If it were a fictitious price or an unreasonable one," he said, "the effect in reducing prices would immediately show up in new business. But a reduction from a fair price does not stimulate business. This industry isn't going to permit competitive products to make inroads on the business. We're thinking about that every day."

The discussion of prices got under way almost as soon as Mr. Feller put his first question to Mr. Fairless. The method by which the United States Steel Corp. determines to make price changes was raised early and Mr. Feller was told that before price changes are finally made effective they are approved by Mr. Fairless.

The subsidiary companies, Mr. Fairless testified, make exhaustive studies of competitive market conditions, and of other business factors, and after carefully weighing these conditions come to definite conclusions with respect to recommendations.

Willys-Overland Letter

From this point Mr. Feller led the inquiry into the subject of price reductions announced in June, 1938 and questioned the witness as to why reductions had not been made sooner. Mr. Feller introduced a letter directed

to the Carnegie-Illinois Steel Corp. by the Willys-Overland Motors, Inc., of Toledo, in November, 1937, explaining that it was being referred to as reflecting the view of one customer as to the prices of steel during "this critical period."

The letter, which called upon the company to "reexamine your price structure," was duly considered by the executives of the company, Mr. Fairless said, adding that the steel mentioned in the letter had been ordered in August, 1937, and that in November it had been rolled to specifications. Mr. Fairless told the committee that his organization did not stand adamant when business was going bad in 1937 but that substantial price concessions were made which did not appear in the published market prices.

"This cannot be confused with the principle of not reducing prices," he declared. "Isn't it more effective to actually reduce prices to those who buy instead of merely making announcements of price reductions in the newspapers?"

Concessions In Price

After being told by Mr. Feller that the questioning was being done "from this side of the table," Mr. Fairless testified that because of "very severe competition" concessions below the base price were made at that time and that the conditions mentioned as desirable in the Willys-Overland letter were actually under way. He told the committee, in response to another question from Mr. Feller that there were many reasons why the published price was not reduced. Among them he listed the uncertainty of the business decline, insisting that there had been many previous dips and they proved to be of only short duration.

"There have been many times when the company has been confronted by requests from customers not to reduce prices because of their inventory problem," Mr. Fairless said. "If business is to be stopped in its decline by reducing prices, it seems to me—and I apologize I am only a layman, not an economist—that the beginning should be made by reducing prices on items made from the finished steel."

"What is the significance of keeping the base price at the same level from

March, 1937, to June, 1938, and what is the significance of the base price at all?" was Mr. Feller's next question.

"Our published base price doesn't mean one thing today and another thing tomorrow," was Mr. Fairless' reply. "It represents the fair price we want and when we can't get it then it's because competition won't permit it. I wouldn't know how to run this business if we had to announce new base prices daily."

Why Prices Hold

"If the published base price remained at the same level during this period and the actual price was below the base due to concessions, why was the published base not reduced during the third quarter of 1937 and the first quarter of 1938 to meet actual realization?" Mr. Feller queried further.

"We didn't have a basis for a price announcement on some products. Prices were all over the map. The base price was as good as any in an unknown market," Mr. Fairless replied, adding that "we didn't feel it was good business to officially reduce prices until June, 1938, at which time we reduced them very substantially."

Referring back to the statement made earlier in the hearing by Mr. Fairless that a reduction in price does not stimulate business, Mr. Feller read into the record a cablegram sent by Edward R. Stettinius, Jr., board chairman, United States Steel Corp., in June, 1938, to Myron Taylor, former chairman of the board, who was in Paris. The cablegram listed new prices on various steel products announced by the corporation and Mr. Feller directed particular attention to the statement that the reductions were made "to meet competitive conditions" with the "hope that such reductions will stimulate a demand for steel products."

Reduction Not a Factor

"Do you think, as a steel executive, that your price reduction was a factor in the increased demand reflected by the figures?" Mr. Feller asked.

"Not to any great extent," Mr. Fairless responded again, describing himself as "an ordinary steel man—not an economist." The corporation spent a lot of time and money making a complete study of that question, and would like to submit it to the committee at the proper time, Mr. Fairless said.

What Mr. Feller was attempting to bring out, he later said in summarizing, was that in June, 1938, the basic

price of steel was reduced; that the United States Steel Corp. expressed a hope that the reduction would stimulate demand, and that "almost immediately the demand for steel did in fact go up." Mr. Fairless reiterated that the effect of the reductions had been slight.

No Chip on Shoulder

A few times during the session tempers flared and once Leon Henderson, former executive secretary of the TNEC and now a member of the Securities and Exchange Commission, asked the witness "to get the chip off your shoulder." Mr. Fairless denied there was any chip and subsequently made his apology about not being an economist. The SEC member later chided the witness for "the bad guess" made in 1937 that the business decline was only temporary and asked him if the corporation had considered getting greater volume by reducing prices.

Mr. Henderson, who considers himself something of an authority on the subject of steel prices, was told that that phase had been given adequate consideration.

Earlier in the hearing, Mr. Fairless described to the committee the conditions which prompted two price increases in 1936 and one increase in 1937. Explaining that he was able to discuss these products and prices only in a general way, the witness related that it was deemed necessary to make the first increase in 1936 because the price on some products had grown far out of line with other products and "we decided to move them up to a point where they'd show some profit." It was not done with the idea of inaugurating any general price increases, he told the committee.

Some More Competitive

To illustrate his point, Mr. Fairless mentioned specifically that plates and strip are in competition with each other and observed also that there is exceptionally keen competition in semi-finished steel.

"In this highly competitive industry, competition exists at all times but many times it exists more in some products than in others," Mr. Fairless asserted.

As for the second price increase in 1936, Mr. Fairless told the committee it was made necessary because of increased wage and material costs. He recalled that in 1936 and 1937 that "it was in the air for higher wages" and said that later the question of vacations with pay was brought up and subsequently made effective by the company.

Questioned by Mr. Feller about a

letter submitted for the record, in which studies of the price situation as related to price increase made necessary by the new labor program were mentioned, Mr. Gregg recounted that certain price increases were proposed at that time but that they did not fully compensate for increased costs on the basis of figures submitted.

Telegrams Exhibited

Submitted for the record by Mr. Feller were two telegrams taken from the Steel corporation's files. One was directed to Mr. Gregg from the Columbia Steel Co., in San Francisco, and covered a recommendation for a \$1 increase in the price for foundry pig iron. The telegram, sent on Feb. 19, 1937, said that the recommendation was made on the basis of a careful survey.

Asked why his telegram in reply suggested that the increase be \$2, Mr. Gregg said he had information in his possession which the company did not have at the other end. Negotiations were under way and we had been advised, he said, that new contracts were about to be signed carrying increased labor costs. In fact, Mr. Gregg continued, wage costs later advanced 16.6 per cent.

After referring to another letter in which it was purportedly recommended that the price of wire rods be increased more than the price for wire in order to narrow the spread, Mr. Feller asked if such a procedure did not seriously affect the profit margin of independent concerns which make wire from purchased wire rod. He was told by Mr. Fairless that the company's price policy since its inception has always been to provide a satisfactory margin between the selling price of semi-finished steel and the selling price of the finished product in so far as the company can exercise control.

Always Fairly Dealt With

Just because at some particular interval the spread is narrowed does not mean exactly what it seems because of the assumption that the spread was satisfactory in the first place, Mr. Fairless said. He denied that the spread was reduced to take profits from the users of semi-finished steel and insisted that "they will testify that they always have been fairly dealt with with respect to raw materials."

He told Mr. Henderson that his company could not assume all the burdens of technological developments but that it had always been the company's policy to sell its semi-finished steel "at a reasonable profit."

PERSONALS . . .

FRANK R. BURNETTE has been appointed construction superintendent of repairs, maintenance and lubrication, Carnegie-Illinois Steel Corp., Pittsburgh. HOWARD L. DAWSON has been appointed engineer, repairs, maintenance, and lubrication.

Mr. Burnette was graduated from the Ohio Northern University and early in his career was employed at the Gary, Ind., works as construction inspector. He joined the American Steel & Wire Co. in 1916 and at the time of his present appointment was assistant chief engineer.

Mr. Dawson was first employed as a draftsman at Carnegie's Edgar Thomson works in 1912 and at the time of his present appointment was maintenance superintendent.

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JOHN F. McCOMB, since September, 1937, assistant sales manager of the wire division of Continental Steel Corp., Kokomo, Ind., has been named sales manager of the merchant trade sheet division for the company's Kokomo and Indianapolis plants. He has been identified with Continental since May, 1928, having been sales manager of the ornamental and chain link divisions until 1934, when he was named assistant sales manager of the Eastern division.

A. C. HUBER, who has been assistant sales manager of the manufacturers' sheet division since 1931, has been ap-

pointed sales manager of that division for the company's Kokomo and Indianapolis plants. He has been identified with the sheet steel industry for 32 years, his previous connections having been with the Stark Rolling Mill Co., later a part of the United Alloy Steel Corp., and with the Alan Wood Steel Co.

HOYT SHEPARD, assistant sales manager of the sheet division since 1930, has been named assistant to the general sales manager. His connection with the organization began in 1921 with the Chapman-Price Steel Co., a subsidiary of Continental since 1927.

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HENRY D. ROLPH, who has been with the Yale & Towne Mfg. Co., Philadelphia, for the past 30 years, has been made director of export sales, with headquarters in the Chrysler Building, New York. Up until the time that Mr. Rolph left Germany on one of the last outgoing trains, he held the position of general manager of the Velbert division, at Velbert, Germany. From there he supervised the production and sales activities of the European staff of the company. In his new position, Mr. Rolph will serve as director and adviser on export sales and operations, not only for the Continental plants but also for American plants.

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EDWARD BERKFIELD, who was for 11 years secretary of the Steel Export

Association of America and before that for five years associated with the United States Steel Products Co. (now the United States Steel Export Co.), has become vice-president of the American Steel Export Co., 347 Madison Avenue, New York, in charge of the steel sales department.

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C. S. PATTON, heretofore manager of equipment sales, Alco Products division of the American Locomotive Co., New York, has been made sales manager of that division. After his graduation as a mechanical engineer from Cornell University in 1918, he spent the following eight years in the shipbuilding industry. In 1926 he became New York manager for the Biggs Boiler Works Co., Akron, Ohio. Three years later he took charge of sales of fabricated plate work for the Heat Transfer Products Co. and continued in that capacity when the latter company was acquired by the American Locomotive Co. and later expanded into Alco Products, Inc.

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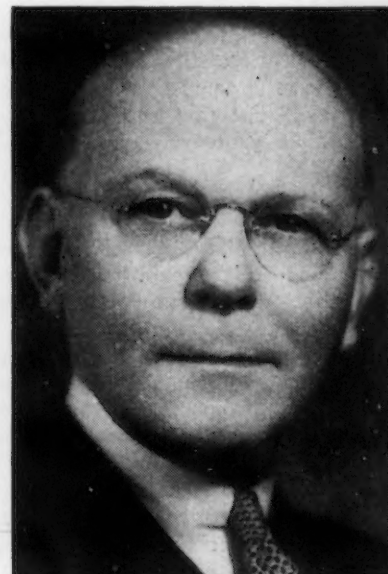
HAROLD J. STEIN, with Allis-Chalmers Mfg. Co., Milwaukee, since 1916, when he started as a student apprentice, has been appointed to the new position of director of research, chemistry and metallurgy of the manufacturing department of the company. The new position is a combination of the chemical, research and metallurgical departments decided upon after the recent retirement of R. S. MACPHERRAN, chief chemist for the company. As a student apprentice, Mr.



F. R. BURNETTE



HENRY D. ROLPH



E. BERKFIELD

Stein worked in the electrical, gas engine, oil engine and turbine departments, and on the test and erection floors in the latter two departments. Later he became foreman of the tractor heat treating department, then general foreman of all the company's heat treating operations, advanced to assistant superintendent of the forge department; assistant research engineer, and in 1936 was made chief research engineer of all A-C manufacturing departments.

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DR. R. H. HARRINGTON, research metallurgist of General Electric Co., Schenectady, N. Y., spoke on "Precipitation Hardening" before the Milwaukee chapter of the American Society for Metals, at the Milwaukee Athletic Club, Oct. 31.

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KENNETH H. CONDIT, executive assistant to the president, National Industrial Conference Board, has been appointed dean of the school of engineering, Princeton University. Following his graduation from Stevens Institute of Technology in 1908, with the degree of mechanical engineer, Mr. Condit entered the employ of the Safety Car Heating & Lighting Co., remaining until 1910. He attended Columbia and Princeton universities, receiving from the latter, in 1913, the degree of civil engineer. He remained at Princeton as part of the teaching staff until 1917, when he joined the U. S. Army Air Service, from which he was discharged in 1919 with the rank of captain. He then joined the

editorial staff of the *American Machinist*, of which he was editor from 1921-1938.

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W. M. HAYES, Detroit district manager of the Air Reduction Sales Co. for the past 13 years, joined the sales organization of P. R. Mallory & Co., Inc., on Nov. 1.

Mr. Hayes is widely known in the automotive and metal working industries through his activities in technical organizations as well as Detroit civic groups. He is a charter member of the Engineering Society of Detroit and has served on its affiliate council and various committees. He is also a member of the Society of Automotive Engineers and the American Welding Society. Mr. Hayes will concentrate his activities in the Central West, and work directly from the plant at Indianapolis, Ind.

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ANDREW F. JOHNSON, mentor of almost all the leading auto body designers in the United States, including three of the famous Fisher brothers (Fred, Alfred and Edward) was the recipient of an honorary life membership in the Society of Automotive Engineers at a dinner in his honor in Detroit on Oct. 30. Mr. Johnson is 86 years old. Among his pupils were OTTO GRAEBNER, chief engineer, Murray Body Corp. of America; EVERETT LUNDBERG, chief engineer of Briggs Mfg. Co.; CARL B. PARSONS, Parsons Co.; JOHN VOTYPKA, chief engineer of Fruehauf Trailer Co., and I. LOUIS

CARRON, Chrysler Corp., and national vice-president of the S.A.E.

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DR. JOHN CHIPMAN, Massachusetts Institute of Technology, will speak on "Gas Evolution and Segregation in Rimming Steel" on Nov. 13 at a Detroit chapter meeting of the American Society for Metals at the Fort Shelby Hotel. The speaker is holder of the Howe Medal awarded to him in 1934 for his paper on "The Application of Thermodynamics to the Deoxidation of Liquid Steel."

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W. L. FISHER, former sales manager of the Steel Storage File Co., Cleveland, has become president and sales manager of Transfer Files, Inc., Cleveland.

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E. J. KULAS, president, Otis Steel Co., and Midland Steel Products Co., Cleveland, received a Doctor of Commercial Science degree from Baldwin-Wallace College, Berea, Ohio, on Oct. 28, at the dedication of the Musical Arts Building, which he and Mrs. Kulas gave to the college.

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J. C. MANTERNACH, American Welding Machine Co., Warren, Ohio, has been reelected president of the Trumbull County Foremen's Club.

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R. O. WATSON, who has been manager of the generator sales department of Westinghouse Electric & Mfg. Co., for the past two years, has been ap-



C. S. PATTON



HAROLD J. STEIN



W. M. HAYES

pointed sales manager of the transportation and generator division, succeeding MAX KENNEDY, who has been assigned to sales activities in the Middle Atlantic States. Mr. Watson has been identified with the company since 1911, when he became a production clerk in the East Pittsburgh works, at the same time attending the company's technical night school. In 1920 Mr. Watson was transferred to the steel mill section of the industrial sales department, becoming manager of that section six years later. In that same year he was named manager of the large motor section of the sales department and transferred to the generator sales department in 1936 as manager of the motor section.

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TERRY FISHER, for many years sales engineer in the Middle West for Cutler-Hammer, Inc., Milwaukee, has been appointed to take charge of the northern Indiana territory, with headquarters in South Bend. Mr. Fisher received his engineering degree from Northwestern University.

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C. B. ARCHIBALD, formerly connected with the railroad sales staff in Chicago of the Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J., has been appointed manager of the St. Louis district, succeeding the late D. F. O'Donnell. E. W. ALLEN, who has been sales engineer at West Orange, has been appointed to the newly created position of manager of engineering and as such will be executive head of the factory engineering and sales engineering departments. He will be succeeded as sales engineer by W. M. SCHLEICHER. J. E. SCHMIDT, formerly superintendent of manufacturing, has been appointed to the newly-created position of manager of the production department, which is a consolidation of the former manufacturing and sales production departments.

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GUY J. BATES, of the General Motors Institute, will lecture Thursday, Nov. 9, to members of the Detroit chapter, American Society of Tool Engineers, on the subject "Better Methods Start with the Tool Engineer."

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EMERSON FRANTZ, general sales manager of Bohn Aluminum & Brass Corp., Detroit, has been elected to the board of directors, replacing the late E. H. Brown.

... OBITUARY ...

HERBERT W. DE BERG, sales representative of United States Steel Corp. for 35 years, died Nov. 3 at his home in Birmingham, Mich. He was born in Englewood, N. J., in 1885 and had lived in Birmingham for 15 years. His first connection with the steel industry came in February, 1901, when he was 16 years old and started with the American Sheet Steel Co. of New York. He continued when the firm became the American Sheet & Tin Plate Co., division of the steel corporation and went to Detroit in 1905.

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CHESTER C. BOLTON, Congressman from Cleveland, and former executive of the Bourne-Fuller Co., Cleveland, died Oct. 29. He was a director of the Cleveland-Cliffs Iron Co., the Lamson & Sessions Co., the Standard Tool Co., Perry-Payne Co., Lakeside & Marblehead Railroad Co., and the Payne-Bingham Co. He was a past-president of the Payne-Bingham Co.

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ARTHUR L. HUMPHREY, aged 79, executive director, Westinghouse Air Brake Co., Wilmerding, Pa., died Nov. 1 at his home in Pittsburgh. He also was an executive in many divisions of Westinghouse, five banks, Pennsylvania-Central Airlines, and an industrial aviation company, as well as being a trustee of the University of Pittsburgh. Mr. Humphrey had been connected with Westinghouse since 1903.

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JOHN M. COWMEADOW, night superintendent of W. H. Davey Steel Co., Cleveland, and former night superintendent of the Canton Tin Plate Works of Republic Steel Corp., died recently, at the age of 70.

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S. PORTER BROWN, manager of the George A. Fuller Construction Co., Boston, died Nov. 1 of a heart attack while supervising work in Springfield, Mass. Mr. Brown was born in Plymouth, Mass., 57 years ago and was a factor in the New England steel fabricating industry.

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HENRY SCHURCK, president and treasurer of Schurck Iron Works, Inc., St. Louis, fabricator of structurals, died there on Oct. 30. He was born in Germany 75 years ago, and founded the iron works in 1889.

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H. P. PREIS, president of the H. P. Preis Engraving Machine Co., New-

ark, N. J., died on Nov. 2, aged 50 years.

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ELMER E. BRITNEY, secretary-treasurer of Standard Castings Co., Cincinnati, died in Cincinnati. He was 75 years old. Before going with the foundry company he was superintendent of the Big Four Warehouse at Cincinnati.

CIO Files Charges Against Western Pipe

SAN FRANCISCO—The CIO Steel Workers Organizing Committee has filed charges with the local office of the National Labor Relations Board that Western Pipe & Steel Co., San Francisco, has violated National Labor Relations Act by negotiating with the Bay Cities Metal Trade Council (AFL) "before representation rights had been determined." The company, which recently received a contract to build five vessels for the Maritime Commission, recently settled a wage dispute with the AFL organization.

Heavy Construction up 17 Per Cent in October

AWARDS for heavy engineering construction projects placed in October amounted to \$245,062,000, or 17 per cent above the September figure and 4 per cent above October a year ago, according to *Engineering News-Record*.

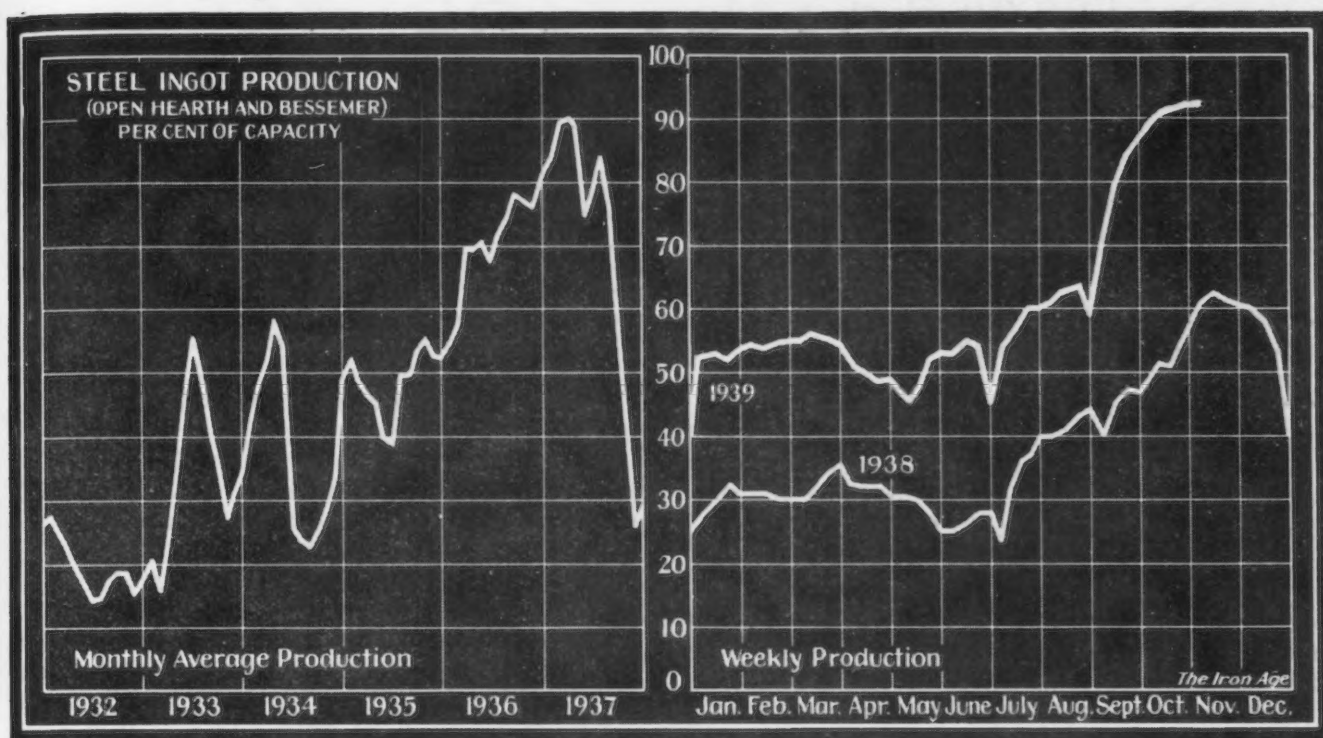
Private awards in October were \$107,727,000, an increase of 71 per cent over the previous month and 86 per cent over October, 1938, while public awards, totaling \$137,335,000, showed a decline of 6 per cent from the September figure and 23 per cent from the October, 1938, total. The chief cause for the spurt in private volume was the large number of industrial buildings contracted for during the month.

Geographically, the largest gain for the month was reported by the Far West where October awards were 144 per cent above September.

War Helps Toy Plant

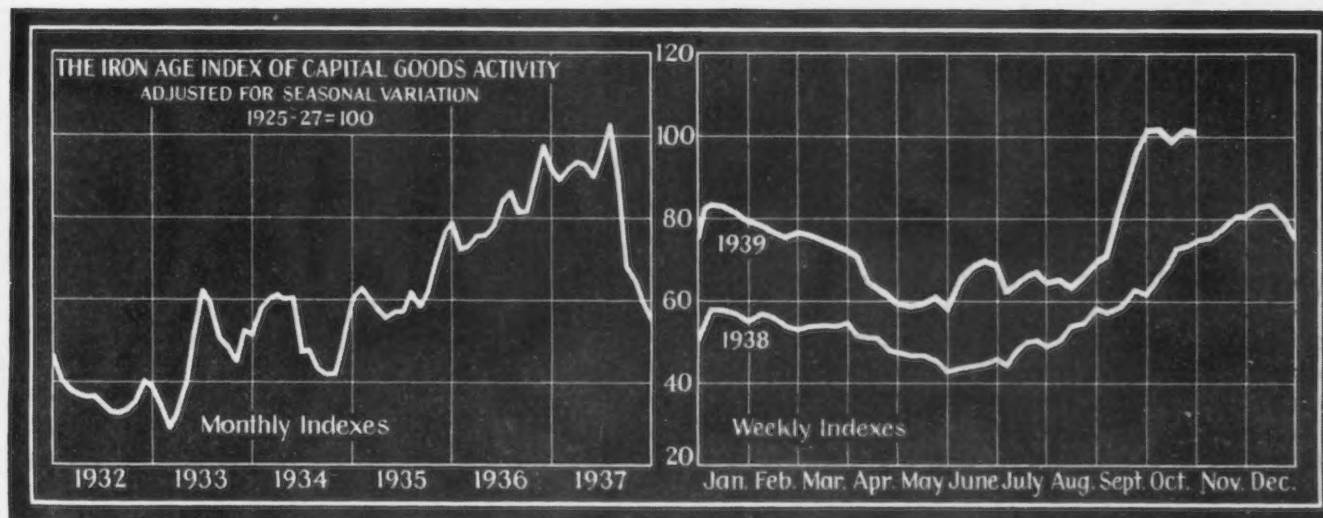
DETROIT—Partly because of the decrease in imports of toys from Japan and Germany, the All-Metals Products Co., Wyandotte, Mich., toy manufacturer, is operating its two plants in two shifts with some departments working three shifts.

Ingot Rate Remains at 93% of Capacity



District	Ingots	Pitts-	Chicago	Valleys	Phila-	Cleve-	Buffalo	Wheel-	Detroit	Southern	S. Ohio	Western	St. Louis	East-	Aggre-
Production, Per Cent of Capacity	CURRENT WEEK..	94.0	91.5	94.0	81.0	86.0	97.0	93.0	100.0	88.0	86.5	90.0	79.5	92.0	93.0
	PREVIOUS WEEK..	93.0	91.5	94.0	81.0	91.0	92.0	92.0	100.0	90.0	86.5	90.0	83.0	95.0	93.0

Index Off Fractionally on Decline in Auto Series



CONFLICT with the seasonal adjustment factors gave rise to a mixed trend in THE IRON AGE index of capital goods activity in the past week. Steel production rose against the trend in the week, while a small decline in the volume of heavy engineering awards was magnified by a sharper drop in the seasonal factors. Loadings of lumber products registered a larger than seasonal decrease and the final figure of the automobile series was down six points as the week's improvement in the assembly pace fell sharply behind the seasonal trend. This loss in the auto series was largely responsible for the fractional decrease in the combined index from 101.0 a week ago to 100.8 in the past week. Pronounced gains in both originating shipments and industrial activity continue to be reported from Pittsburgh. The still climbing rate

of operations there boosted the index of that series to 114.0 at the end of the past week, thus passing the position of the comparable week of 1929 for the first time during the current upswing.

	Week Ended Nov. 4	Week Ended Oct. 28	Comparable Week	
			1938	1929
Steel ingot production ¹	134.4	132.2	80.8	106.3
Automobile production ²	107.8	113.8*	90.8	116.4
Construction contracts ³	78.3	77.4	80.2	112.0
Forest products carloadings ⁴	69.6	71.4	56.6	118.0
Production and shipments, Pittsburgh District ⁵	114.0	110.3	64.9	112.0
Combined index	100.8	101.0*	74.7	112.9

*Revised.

Sources: ¹THE IRON AGE; ²Ward's Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... *Government spokesmen again frown on steel price increases.*

... *October ingot production breaks all records; pig iron up 21.9 per cent.*

... *Operations still at 93 per cent, but scrap weakens at Pittsburgh.*

THE atmosphere created by the statements of Government spokesmen at the opening of steel hearings by the Temporary National Economic Committee in Washington is not propitious for the advancing of steel prices for the first quarter. Hence opinion in the trade leans more strongly than a week ago to the belief that there will be no horizontal increases, but possibly some "adjustments" on certain products, particularly tin plate, galvanized sheets and pipe.

It is becoming increasingly clear that Government pressure by suasion and not by ukase will seek to prevent inflationary tendencies in prices, inventories and wages in an effort to soften the shock of transition to normal conditions whenever peace shall arrive.

In addition to the influence of the TNEC hearings, the factors which are likely to have an important bearing on price decisions are: The probability of substantial earnings in this quarter and the next regardless of price changes; the restlessness of labor as shown by the demand upon one independent company for a wage increase; the failure of steel scrap prices to continue their recent advance, and, not the least of all, the possibility that there will be an easing in the heavy demand for steel some time after the first of the year.

MEANWHILE, the outstanding factor in the present steel situation is the continued urgent demand for the hurrying of shipments. Some steel companies have had to upset rolling schedules in order to accommodate customers who have said that their plants would be shut down soon unless they could get steel. Such an urgent need for steel is at variance with commonly accepted beliefs that there is a reckless building up of inventories. This does not appear to be true so far as the fabricators of steel products are concerned, but there is some doubt as to the movement to the ultimate consumer of all of the finished articles that are being produced.

Current steel orders are largely for first quarter delivery, but there has been an easing of the buying pace in view of the possibility that prices generally may not be advanced. In a few instances consumers have asked for second quarter reservations, but mills are unwilling to go that far ahead.

Revision of the Neutrality Act has had no appreciable effect on steel demand as yet. Steel export trade

has subsided to about the level of last August. Temporary delays in shipping may be caused by the necessity of obtaining foreign bottoms to send steel into proscribed zones, but ample ship space is expected to be available within a week or two.

OCTOBER was a record-breaking month in steel production and established near-records in some collateral activities. Last month's output of ingots was 5,393,821 gross tons, exceeding the previous all-time record of 5,286,246 tons in May, 1929. This was a gain of 28 per cent over September and 74 per cent over the October total last year.

Lake Superior iron ore shipments also were of almost record-breaking proportions, totaling 9,201,249 tons, the largest October movement since 1926 and the largest for any month since 1937. The largest monthly movement in the past two decades was 10,811,380 tons in August, 1937.

Pig iron production in October failed to break a record, but the daily rate was the highest since August, 1929. Total output last month was 3,627,590 gross tons compared with 2,878,556 tons in September. On a daily basis of 117,019 tons the October rate was 21.9 per cent over the rate of 95,952 tons in September. On Nov. 1 there were 188 furnaces in blast making iron at a rate of 120,565 tons a day, a gain of 19 during the month. This number in blast is the largest since Nov. 1, 1929, when there were 203, many of which were of smaller capacity than those now operating. The October production was equal to 85.9 per cent of the industry's capacity against 70.4 per cent in September. U. S. Steel added five furnaces, independents 10 and merchant producers four during the month.

Additional furnaces will go into blast this month. Two have already been reported. The rebuilt Republic stack at Warren, Ohio, started operations on Nov. 3 while a furnace at the Mingo Junction plant of Carnegie-Illinois is scheduled to go in this week. Pig iron production in the Mahoning Valley is at the highest point in 15 years, 22 of 25 furnaces being active, while in the Pittsburgh district 41 of 50 furnaces are in blast.

Steel ingot production for the current week is estimated at 93 per cent, unchanged from last week. Operations have declined temporarily at Cleveland and Birmingham because of open-hearth furnace repairs and are also slightly lower in St. Louis and New England, but the rate at Pittsburgh has gained another point to 94 per cent and the Buffalo district has risen five points to 97 per cent.

Despite continued high steel production, scrap markets are weaker. At Pittsburgh the No. 1 heavy melting steel price is off \$1 and railroad scrap, owing to more plentiful offerings, is \$2 to \$2.50 lower. THE IRON AGE scrap composite price has declined, following a slight rise last week, to \$20.63, almost back to its level at the end of September.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails, Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Reroiling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.10	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	†\$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Clin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Heavy melting steel, P'gh...	\$21.50	\$22.50	\$23.50	\$15.00
Heavy melting steel, Phila...	21.75	21.75	23.00	14.75
Heavy melting steel, Ch'go...	18.625	18.625	19.75	13.75
Carwheels, Chicago	17.50	17.75	18.00	13.00
Carwheels, Philadelphia	22.25	22.25	22.25	16.75
No. 1 cast, Pittsburgh	22.25	22.75	22.75	15.50
No. 1 cast, Philadelphia	24.25	24.25	24.75	16.75
No. 1 cast, Ch'go (net ton)	16.25	16.25	17.25	12.75

Coke, Connellsville

Per Net Ton at Oven:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Furnace coke, prompt	\$5.00	\$5.00	\$4.75	\$3.75
Foundry coke, prompt	5.75	5.75	5.50	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 7, 1939	Oct. 31, 1939	Oct. 10, 1939	Nov. 9, *1938
Copper, Electrolytic, Conn...	12.50	12.50	12.50	11.25
Copper, Lake, New York	12.50	12.50	12.50	11.375
Tin (Straits), New York...	**54.50	**55.50	**55.00	46.625
Zinc, East St. Louis	6.50	6.50	6.50	5.05
Zinc, New York	6.89	6.89	6.89	5.44
Lead, St. Louis	5.35	5.35	5.35	4.95
Lead, New York	5.50	5.50	5.50	5.10
Antimony (Asiatic), N. Y.	16.50	16.50	14.00	14.00

**Nominal.

The Iron Age Composite Prices

Finished Steel

Nov. 7, 1939	2.236c. a Lb.
One week ago	2.236
One month ago	2.236
One year ago	2.286

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1939.....	2.286c., Jan. 3;	2.236c., May 16
1938.....	2.512c., May 17;	2.211c., Oct. 18
1937.....	2.512c., Mar. 9;	2.249c., Jan. 4
1936.....	2.249c., Dec. 28;	2.016c., Mar. 10
1935.....	2.062c., Oct. 1;	2.056c., Jan. 8
1934.....	2.118c., Apr. 24;	1.945c., Jan. 2
1933.....	1.953c., Oct. 3;	1.792c., May 2
1932.....	1.915c., Sept. 6;	1.870c., Mar. 15
1931.....	1.981c., Jan. 13;	1.883c., Dec. 29
1930.....	2.192c., Jan. 7;	1.962c., Dec. 9
1929.....	2.223c., Apr. 2;	2.192c., Oct. 29
1928.....	2.192c., Dec. 11;	2.142c., July 10

Pig Iron

\$22.61 a Gross Ton
22.61
22.61
20.61

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
\$22.61, Sept. 19;	\$20.61, Sept. 12	
23.25, June 21;	19.61, July 6	
23.25, Mar. 9;	20.25, Feb. 16	
19.73, Nov. 24;	18.73, Aug. 11	
18.84, Nov. 5;	17.83, May 14	
17.90, May 1;	16.90, Jan. 27	
16.90, Dec. 5;	13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	

Steel Scrap

\$20.63 a Gross Ton
20.96
22.08
14.50

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$22.50, Oct. 3;	\$14.08, May 16	
15.00, Nov. 22;	11.00, June 7	
21.92, Mar. 30;	12.92, Nov. 10	
17.75, Dec. 21;	12.67, June 9	
13.42, Dec. 10;	10.33, Apr. 29	
13.00, Mar. 13;	9.50, Sept. 25	
12.25, Aug. 8;	6.75, Jan. 3	
8.50, Jan. 12;	6.43, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 9	

THIS WEEK'S MARKET NEWS

PRICES

... Steel castings quotations advanced 5 and 6%

IN view of the trend of the TNEC investigation in Washington and the acceptance of heavy first quarter business by the mills, the opinion grows that any price advances that may be announced for the next quarter will be minor.

Effective Nov. 15 some producers are advancing the prices on miscellaneous steel castings 5 and 6 per cent. This increase is the reinstatement of a corresponding reduction made in 1938 and will serve in part to compensate the steel foundries for higher raw material costs.

NEW BUSINESS

... Mills filling up for first quarter in major products

REVISION of the Neutrality Act has been followed by moderately increased activity in raw materials and equipment. It is understood at CLEVELAND that some new business from France has come out recently, including a small munitions order booked by a Middle Western plant, a likely forerunner of larger orders.

Solicitation of first quarter business, with price to be determined later, is being carried out by steel companies. At CLEVELAND and YOUNGSTOWN the daily volume of aggregate new orders during the past two weeks has been equal roughly to the August flow. Backlogs in a few products now run into February. Hot mill capacity is overtaxed at many points.

Fresh orders at PITTSBURGH have eased off moderately from a week ago, although the total volume of new orders for first quarter shipment at an unknown price is not far from the level which has existed for the past three weeks. More definite specifying is expected when first quarter price announcements have been made.

Since Sept. 1 approximately 48,000 railroad freight cars have been ordered and over 7500 more are expected to be placed before the end of the year. With approximately 12,000 cars having been ordered this year previous to Sept. 1, there is every indication that the yearly estimated total of 67,-

000 freight cars will be the best since 1929.

Orders for first quarter delivery are coming into CHICAGO sales offices at a fairly good rate. The week to week trend is rather uncertain, one mill's bookings fluctuating widely in both directions over the last three weeks. Another district mill estimates that sufficient new business is being received to support 75 to 80 per cent operations. Most of these orders are for sheets with bars, plates, and light shapes following in importance. Lightest demand today is probably for heavy structural shapes.

On the basis of commitments already made one mill in CHICAGO estimates that its sheet capacity is already spoken for, though the formal orders are not yet in. It is generally believed in the CHICAGO area that first quarter capacity in all major products will be sold out within another 30 days. It seems fairly certain that most large consumers are now covered for their first quarter requirements. In most cases, however, material shipped has not exceeded by far actual needs. Inventories, consequently, are probably not excessive except in isolated instances. Production of farm implements and farm tractors is high, demand for steel from some of these plants being the highest since 1937.

All of the mills in the CHICAGO district continue to report great pressure from consumers for deliveries. Illustrative of one of many mill problems today is the overtime situation. One CHICAGO mill has recently been averaging \$40,000 a week in overtime payments.

New bookings in PHILADELPHIA in the past week showed a further slackening. Most mills are currently booked well through February on most products, although in the case of hot rolled sheets and strip and merchant bars several producers have booked all that can possibly be shipped in the first quarter. Smaller producers in eastern Pennsylvania, however, are still able to book ship sheared plates for December delivery and universal plates in three weeks. Most mills are capitalizing on the present let-down in buying to press for rolling specifications on the first quarter business, in some cases insisting upon these specifications before entering new orders on their books. Pressure for delivery is mounting and judging from the

urgency of consumers' requests for shipment the bulk of present mill output is going directly into production. The railroads are particularly aggressive in seeking early delivery of plates and small shapes in order to keep their car building and repair programs moving.

Export inquiry from South America is brisk and involves all kinds of steel. Nevertheless the percentage of foreign business now held by some steel companies is slightly below normal in comparison to aggregate orders. Export sales are said to be approximately at the August level.

STEEL OPERATIONS

... Rate remains at 93%, with some gains and some losses

THERE have been some further gains in steel operations and some losses, the net result being an estimated industry rate of 93 per cent this week, unchanged from last week.

Losses have occurred in the CLEVELAND-LORAIN, ST. LOUIS, NEW ENGLAND and BIRMINGHAM districts, the decline at CLEVELAND and BIRMINGHAM being necessitated by the shutting down of open-hearth furnaces for repairs.

Offsetting the losses are gains in the PITTSBURGH, BUFFALO and WHEELING-WEIRTON districts. The PITTSBURGH district is up one point to 94 per cent. The BUFFALO district is operating at 97 per cent, a gain of five points over last week.

PIG IRON

... Production and shipments continue at high rate

ELSEWHERE in this issue are the detailed figures on pig iron production in October, which totaled 3,627,590 gross tons. On a daily basis this was a gain of 21.9 per cent over the September output.

Forty-one of the 50 blast furnaces in the immediate Pittsburgh district are now in blast. It is expected that before the end of the year a few additional furnaces will be brought in. Carnegie-Illinois Steel Corp. has blown in its third and remaining blast furnace at Mingo Junction, Ohio. All three furnaces at that point

are making iron to be utilized in the production of synthetic scrap, since steel finishing operations there have been suspended for some time. Pig iron demand at PITTSBURGH continues at about the same pace as a week ago, with shipments increasing daily.

November shipments of CLEVELAND sellers are expected to hold at the high level attained in October. Foundry coke shipments for at least the first half of November will be easier, however, due to coverage prior to the price advance. The Republic stack at Warren, idle since it was blown out Aug. 12 for rebuilding, is in blast again. Capacity of this stack is now greater and may reach somewhere between 1000 and 1200 tons a day. With this addition, Republic is now operating all of its blast furnaces in the Mahoning Valley and Valley production is at the highest point in 15 years, with 22 out of 25 stacks active.

November pig iron shipments in the Chicago district will show a 6 per cent improvement over October, according to preliminary estimates. October activity was 20 per cent higher than in September. Shipments of foundry coke are proceeding practically at capacity, indicating a high foundry melt.

October shipments of pig iron were definitely better than during September in the SOUTHERN OHIO district with current specifications being at about the October rate. Melters generally are interested in keeping themselves well covered with conservative inventories on hand. Foundry operations are being maintained at just above the 60 per cent level with machine tool melts the heaviest.

A few sales of pig iron at the \$2 advance effective since Sept. 15 are being made in the St. Louis area. As nearly all melters have bought their requirements for the remainder of the year at the old price, not much buying is expected until after the turn of the year. Shipments continue at a lively rate.

Furnace operations are unchanged at BIRMINGHAM with all of the district's 18 blast furnaces in blast. There is little new business, but all of the furnaces have large backlogs and shipments are at a high rate.

Pressure for shipment by consumers in the PHILADELPHIA district is unabated. While undoubtedly a small part of present shipments is going into inventories, it is pointed out that up to early September all foundries were operating on a hand-to-mouth basis with practically no inventory

and it will require a very substantial amount of stocking to build inventories up to a "normal" level. Operations continue to show a slow, but steady improvement, particularly in plants supplying parts to the railroads and shipyards.

NEW ENGLAND foundries are more active than at any time since 1929, and indications strongly point to 1929 records being smashed before the close of the current year. Some foundries are so pushed for castings they are molding night and day. The aggregate New England melt is now between 80 and 85 per cent, with the machine tool and textile machinery makers the strongest spots. The New ENGLAND pig iron situation is brighter than it has been in years.

Foundry production in the BUFFALO district is up well with a substantial backlog of orders.

New business in the NEW YORK area remains light, sellers concerning themselves principally with delivery problems. Water shipments are being hastened before the winter freeze-up sets in. There is every indication that iron on contract for fourth quarter will all be taken out before Dec. 31. Foreign sales are light, although inquiries continue in good volume. On Monday a cargo of pig iron left on the Ada Gorthon for Sweden.

RAILROAD BUYING

... Current year most active since 1931, except 1936

THE crest of the railroad equipment buying wave appears to have passed. However, the purchases made during the height of the wave will make this year the most active year since 1931, with the one exception of 1936.

Equipment purchases made in October totaled 11,220 freight cars, 34 locomotives and 28 passenger-car trains, as compared with 24,231 freight cars, 52 locomotives and 3 passenger-car trains in September, according to a compilation by *Railway Age*. Cumulative totals of purchases for the first 10 months of the current year are 44,843 freight cars and 247 locomotives. The freight car total is over two and one-half times the figure for the entire year of 1938, while the locomotive figure represents a gain of 90 per cent over the first 10 months of 1938.

Rail orders in October were 508,110, the publication reports, the largest tonnage placed in any month since

October, 1929, and bringing the 10 months' cumulative total to 1,229,847 tons. This 10-month figure is higher than any yearly total since 1929, with the exception of 1936 when 1,396,415 tons was ordered, and compares with 230,115 tons placed in the first 10 months of 1938.

Delaware, Lackawanna & Western has purchased 1100 cars distributed as follows: 500 box cars from Magor Car Corp.; 500 hopper and 100 gondola cars from American Car & Foundry Co. Approximately 12,000 tons of steel will be required.

Bessemer & Lake Erie has ordered 1000 hopper cars from Pullman-Standard Car Mfg. Co., 500 gondola cars from Pressed Steel Car Co., 500 box cars from Greenville Steel Car Co., and 50 hopper cars from American Car & Foundry Co.

Elgin, Joliet & Eastern, a U. S. Steel subsidiary, has ordered 2050 cars distributed as follows: 300 50-ton hopper cars to General American Transportation Corp.; 300 50-ton hopper cars to Pullman-Standard Car Mfg. Co.; 300 50-ton hopper cars to Ralston Steel Car Co.; 600 50-ton hopper cars to American Car & Foundry Co.; 500 50-ton gondola cars to Mt. Vernon Car Co., and 50 70-ton cement cars to American Car & Foundry Co. Union Railroad, another subsidiary, has bought 60 dump cars from Differential Steel Car Co. and 40 dump cars from Magor Car Corp. Newburgh & South Shore has bought 100 50-ton gondola cars from the Magor Car Corp.

In addition to the 1300 cars bought by Northern Pacific and reported in THE IRON AGE, issue of Oct. 26, p. 75, this road has purchased 50 hopper cars from American Car & Foundry, 100 ballast cars from the same company, 50 more hopper cars from the General American Transportation Corp. and 500 gondola cars from Pressed Steel Car Co. This latest purchase brings the total cars ordered by Northern Pacific up to 2000.

Other purchases include 500 box cars for Texas & Pacific, placed with Mount Vernon Car Mfg. Co.; 50 hopper cars for Chicago & Illinois Midland, ordered from Pullman-Standard Car Mfg. Co.; 125 tank cars for U. S. War Department, from American Car & Foundry Co., and 100 gondola cars for Youngstown & Northern, placed with Magor Car Corp. Boston & Maine has placed three diesel-electric locomotives with Electro-Motive Corp. and one with American Locomotive Co.

Atchison, Topeka & Santa Fe is taking bids on 27 ore cars.

STRUCTURAL STEEL

... Awards total 20,550 tons, inquiries 22,750 tons

STRUCTURAL steel lettings at 20,550 tons are slightly lower than a week ago, with the greatest activity in the Central States. Among outstanding awards are 2300 tons in New York for a viaduct on 11th Avenue for the New York Central Railroad; 2000 tons for a bridge at Calumet, La.; 1955 tons for the superstructure of the Western Avenue viaduct, Chicago; 1400 tons for the Commercial National Bank Building, Shreveport, La., and 1150 tons for trash racks, bulkheads and other structures for the Fort Peck Dam, Mont.

New structural steel projects advanced to 22,750 tons from 8,100 tons last week. Sizable inquiries are 7000 tons for shop buildings at the Brooklyn Navy Yard; 3500 tons for a high school at Forest Hills, N. Y.; 2100 tons for a Federal office building in Washington; 1665 tons at Antler, Cal., for a bridge across the Sacramento River, and 1440 tons at San Diego, Cal., for the Consolidated Aircraft Co.

Plate awards of 3150 tons include 3000 tons for the Gulf Oil Corp. at Port Arthur, Tex.

CHICAGO mills report that orders in the past week from structural fabricators have decreased sharply. This slack was taken up, however, by other consumers, notably builders of railroad rolling stock, since the manufacture of cars requires considerable light structural shapes.

Fabricators in the St. Louis district are operating at from 25 to 40 per cent of capacity. Little business in immediate prospect.

SEMI-FINISHED STEEL

... Demand still exceeds capacity of the mills

SPECIFICATIONS for semi-finished steel are coming in at a fast clip in the PITTSBURGH district with shipments being held up only to the extent that production difficulties prevent carrying out of prearranged schedules. Demand for semi-finished steel is still greater than the ability of mills to take on the tonnage, although customers are being taken care of in such a way as to prevent serious interference with consumer production schedules.

The jam on semi-finished items continues unabated at CLEVELAND. A few forgers whose accustomed shipments at regular intervals have been disrupted recently are reported desperately in need of material. Producers are making every effort to assist in helping satisfy legitimate requirements. Integrated steel producers have many problems of their own, including difficulty in shipping billets from one plant to another because of the different sizes prevailing.

SHEETS AND STRIP

... Mills could easily fill up first quarter schedules

ANY leveling off in sheet and strip specifications at PITTSBURGH in the past week from the previous period has been moderate and, if mills accepted all the tonnage offered them, the filling up of first quarter schedules would take little or no time at all. Shipments are going out in a relatively prompt manner with substantial tonnages being taken by automobile companies. Mills generally are now rolling an increasingly large percentage of business booked at the current published price. There are already isolated cases where consumers in September underestimated their requirements. Barrel makers are exceptionally busy and appear to be using steel as fast as it reaches them. Analysis of current specifications and commitments discloses participation by all lines of consumption.

Some of the CLEVELAND and YOUNGSTOWN mills' backlogs now extend into February. Particularly heavy are backlogs of strip and sheets up to 36 in. wide. Hot mill capacity is overtaxed at many points. Light plates from continuous mills are in such strong demand by the railroads that production of normal tonnage is greatly complicated.

Though orders during October were being received by CHICAGO mills at a much slower rate than in the previous month, there is still a considerable tonnage coming in every day for first quarter delivery. It is considered not at all unlikely that some CHICAGO mills will be filled up for first quarter within another 30 days. One mill already has made sufficient first quarter flat rolled commitments to exhaust its capacity for that period, though formal orders for all of this tonnage have not yet been received. Some CHICAGO district sheet consumers are benefiting from the hold-up of shipments resulting

from the Chrysler strike by being accorded speedier deliveries.

Bookings of sheets for first quarter delivery at prices then in effect are proceeding at a rate in the SOUTHERN OHIO district which may fill order books completely for the first quarter before the end of this year. District mills are out of the market on everything except electrical sheets and the margin in these is not broad. Production is at a virtual capacity, with the leading district interest up to schedule on deliveries from Middletown and Ashland units but a trifle behind schedule at Butler. This latter situation arises from the fact that a substantial number of new employees have been put on at the Butler unit and they have not yet arrived at full efficiency.

Some of the smaller sheet producers still have open spots in their December rolling schedules, particularly for galvanized, but are quoting their price in effect at time of shipment after Dec. 1.

PLATES

... Backlogs extend into February at some mills

WITH the larger steel companies out of the market on plates for the fourth quarter and with deliveries on some sizes running into February, the Eastern mills are supplying most of the demand for prompt shipment.

A moderate amount of business is being booked by some of the Eastern mills at a base price of 2.35c., basing point. These mills are now quoting three to five weeks' delivery on sheared plates and not more than three weeks on universal plates.

MERCHANT BARS

... Orders for some sizes extend into February

FRESH bar business at PITTSBURGH in the past week has not been much if any below the volume of a week ago. Orders ease off for a few days and at subsequent periods increase enough to offset the previous leveling off. Production is at virtual capacity. Probably very little of the tonnage for which commitments were made in September will extend into the first quarter. Business placed within recent weeks, however, has been sufficient to

earmark no small amount of bar capacity in the first quarter.

On certain sizes, especially the smaller sizes, capacity of CLEVELAND and YOUNGSTOWN mills is booked up three months ahead. Backlogs of 8-in. units extend well into February. On the other hand, 12-in. mills are only engaged into late December. Most sellers have been soliciting first quarter business with price to be determined later.

Demand for merchant bars in CHICAGO last week was the highest of all products in one sales office and the second highest in another. Forgers, farm implement and tractor makers, jobbers and miscellaneous consumers are actively reserving places on mill schedules for first quarter. It is believed that before long, all large buyers will be covered for their first quarter needs.

TUBULAR GOODS

... Steady flow of pipe business at Pittsburgh

TUBULAR specifications at PITTSBURGH are holding at recent levels and October bookings were the best for a long time. Although many domestic oil companies had anticipated their requirements in September in order not to be embarrassed by steel shortages, etc., some of these same consumers have been in the market recently with additional specifications. No general influx of oil country goods orders is expected much before the first of the year but pipe production, because of bookings already placed, will be maintained at present levels for the rest of the year. Standard pipe demand continues its upward trend and appears to represent actual consumption rather than jobber inventories. No small portion of current

standard pipe purchases is going into renovation and repair of industrial plants and homes.

WAREHOUSE BUSINESS

... Dealers taking orders for export ... Some prices higher

A SHARP increase in export demand was experienced by resale interests in the metropolitan New York-New Jersey area in October, with Canada and South American countries particularly active. Fairly heavy tonnages were sold for shipment to Newfoundland, Iceland, the West Indies and Scandinavian countries. The export sales were widely diversified as to product and full market price, plus packing charges, was obtained. Domestic buying continues very brisk and price concessions have virtually disappeared. Quotations on galvanized sheets were recently marked up to 5.23c. per lb. for lots less than 1500 lb., and long ternes were advanced to 5.90c. in the same quantity bracket.

REINFORCING BARS

... Lettings total 5115 tons and inquiries 10,165 tons

REINFORCING steel awards total 5115 tons and include 1800 tons at CHICAGO for the General Electric Co.; 1100 tons of magazine buildings at Savanna, Ill., and 1000 tons for a housing project at Peoria, Ill.

Among new reinforcing projects of 10,165 tons are 2800 tons for a water softening plant at La Verne, Cal., and 1800 tons for a store for Lit Brothers in Philadelphia.

Pacific States Steel Corp., Niles, Cal., and Bethlehem Steel Co. sub-

mitted almost identical bids on 3230 tons for Shasta Dam.

New concrete bar inquiries have been off seasonally recently but a fair amount of tonnage is moving to jobber warehouses where inventories are anything but large. A substantial amount of concrete bar business has been placed recently involving jobs of under 50 tons.

BOLTS, NUTS AND RIVETS

... Peak of shipments is expected this month

SHIPMENTS are expected to hit their peak this month. Production is highest since 1937 but output of some companies has not risen as far as it could because of limitations on marginal employees. Thus it appears shipments probably will be extended by necessity into first quarter.

Some cap screw producers anticipate a slight decline in jobber buying during first quarter, possibly around 20 per cent below the fourth quarter rate of buying. Diversified consumers are expected to continue actively in the market.

WIRE PRODUCTS

... Mills are entering orders well into first quarter

ORDERS for wire rods and manufacturers' wire at PITTSBURGH are holding at recent levels. Such business is for shipment at mills' convenience at an unknown price. At the rate fresh business is coming to producers, it is expected that mill books will be substantially filled with first quarter bookings within a short time. Merchant wire demand continues to be

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 7, 1939	Nov. 2, 1939	Oct. 10, 1939	Nov. 9, 1938	1939	1938
Fabricated structural steel awards	20,550	22,600	12,600	23,725	851,175	769,850
Fabricated plate awards	3,150	11,460	2,020	1,600	174,315	116,390
Steel sheet piling awards	2,770	1,270	545	5,435	73,065	41,625
Reinforcing bar awards	5,115	16,100	9,050	6,400	412,665	299,150
Total Letting of Construction Steel..	31,585	51,430	24,215	37,160	1,511,220	1,227,015

held in check by producers' inability to ship much if any additional material the rest of this year.

Wire mill operations at CLEVELAND are the highest in two years and close to the national ingot production rate, although slightly reduced from last week's schedules. Order volume extends well into first quarter, particularly on rods and barbed wire. South American export demand for all items remains vigorous.

IRON ORE

... Shipments of 9,201,249 tons largest for any October excepting 1926

THIS month holds every promise of being more active from the standpoint of Lake Superior iron ore shipments than any November since 1920, when 5,000,000 gross tons came down the Great Lakes. Although the largest shipping interest plans to end its season Nov. 15, other vessels will remain in service as long as possible.

Shipments from upper Lake ports during October totaled 9,201,249 tons, largest for any October in history excepting 1926, according to the Lake Superior Iron Ore Association. This brought the season's shipments to 39,593,570 tons, more than double the 17,781,706 tons shipped up to Oct. 31 last year. The total includes 31,457 tons of Canadian ore shipped from Michipicoten. Tonnage was 153 per cent above the 3,624,416 gross tons carried in October, 1938.

TIN PLATE

*... Operations unchanged at 96%
... No letdown seen before January*

TIN plate operations remain steady and unchanged at 96 per cent of capacity. No important change in this rate is expected until January, when a temporary let-down is looked for. As far as can makers are concerned, the present flow of tin plate is being immediately cut into cans and moved to the next field of consumption. The general upswing in business conditions has brought about a corresponding increase in general line can consumption. Republic Steel Corp., it is reported, will on Dec. 1 resume operations at its subsidiary tin plate mill at Cumberland, Md. The plant has been shut down for the past two years.

British Steel Prices Likely to Rise Nov. 1

LONDON—A substantial rise in British steel prices is expected at the end of October, when the current period of price stabilization expires. This increase will be effected by an unusual method—the surcharge is to be paid by the steel producers into a central pool which will be used by the British Iron & Steel Corp. to meet additional charges for raw materials resulting from the war.

Since the outbreak of war, British prices have been controlled at the pre-war levels which had been stabilized since Jan. 1. Cuts ranging from 6 to 8¼ per cent were put in operation on that date. The expected increase will, however, more than wipe out these cuts, although it may be somewhat alleviated by rebates to certain classes of consumers.

So far, increased costs are chiefly the result of the sharp rise in ocean freight rates, war risk insurance and exchange depreciation. But the basic price of imported raw materials and semi-finished material has also risen.

The British scrap position remains strong, although owing to inevitable shipping delays the delivery of the remainder of large tonnages contracted for in the United States earlier in the year has been retarded. As a result of this delay, manufacturers and traders in all parts of Britain are being asked by the central organization to intensify a clearance of scrap iron and steel from factories, yards, etc. Large-scale process and obsolete scrap, such as that returned by the metal working and shipbreaking trades, it is thought can be safely left to the merchant system for the present.

Scrap purchases by the British iron and steel industry in active years may be placed at between 4,000,000 and 5,000,000 tons. It is as yet too early to estimate what additional supplies will be forthcoming from a speeding-up of the disposal of old plant, etc., but they will certainly be substantial.

For the present no general alteration in scrap prices is contemplated. Present prices, as set out in the Control Order, are in no case lower than before the declaration of war and merchants have already been granted, in addition, a 2½ per cent commission. The special burdens on costs in the steel industry arising from the war do not, of course, apply to the scrap trade. Should the additional supplies of domestic scrap anticipated from the

"Clean-up" of old plant fall short of expectations, the authorities will no doubt take powers to increase supplies by other means. But under no circumstances does any acute shortage appear likely.

... GREAT BRITAIN ...

... Price question hinders steel buying in the United States.

LONDON, Nov. 7 (By Cable)—The removal of the United States embargo is not expected to accelerate Allied buying of steel as the main hindrance still is the price question, and the Allies at present are amply provided.

British maximum home trade prices have been advanced for November and December delivery as follows: pig iron, 9s.; semi-finished and heavy steel, 20s., rerolled steel including sheets up to 27s. 6d.

Full outputs have been attained in most works.

Tin plate maximum home trade price has been advanced 1s. 1d. per base box to 21s. 6d. f.o.t. Makers are expressing dissatisfaction at the lowness of this figure owing to increasing costs. Export sales are still effected in large quantities up to 31s. basis f.o.b. A committee of Welsh makers has been formed to investigate the possibility of introducing preferential sales in the British Empire market. Unofficial strike by tin plate mill openers is jeopardizing production. Tin plate bars have advanced 20s. to £8 5s., delivered.

Scrap Institute Publishes Yearbook

THE Institute of Scrap Iron and Steel, 11 West 42nd Street, New York, has published the first edition of an annual yearbook which contains a great deal of information regarding the industry. An introductory chapter is a "primer on scrap" which explains the importance of scrap and its uses, how it is gathered and sold, etc. Other chapters give vital statistics of the industry, including domestic consumption by years and months, consumption of scrap compared with production of iron ore, pig iron and steel ingots, world export and import figures, railroad traffic in scrap, specifications for various grades, and other details. A list of the members of the institute is included. Copies of the booklet are available to non-members at \$1 each.

October Steel Output of 5,393,821 Tons Highest on Record; Operating Rate 89.17%

A TOTAL of 5,393,821 gross tons of open hearth and bessemer steel ingots was produced during October, the highest monthly total on record, the American Iron and Steel Institute's monthly report shows.

The previous record month was May, 1929, when 5,286,246 gross tons was produced.

Steel ingot output in October was 28 per cent greater than the September output of 4,231,310 gross tons and was 74 per cent above the total of 3,105,985 gross tons produced in October, 1938.

During the past month the steel industry operated at an average of 89.17 per cent of capacity, which compares with 72.41 per cent in September and 52.25 per cent in October a year ago. In May, 1929, when the industry's annual ingot capacity was approximately 10,000,000 tons, or 14 per cent less than in 1939, the industry operated at full capacity.

An average of 1,217,567 gross tons of ingots was produced weekly during October, as against 988,624 gross tons per week in September and 701,125

gross tons per week in October of last year.

... PIPE LINES ...

Humble Pipe Line Co., Humble Building, Houston, Tex., plans new 8-in. welded steel pipe line from Colorado oil field, Jim Hogg County, recently developed, to connection with main pipe line system, for crude oil transmission. Cost over \$60,000 with booster station and other operating facilities.

Continental Oil Co., Ponca City, Okla., will begin work soon on new 8-in. welded steel pipe line from San Diego oil field district, Duval County, Tex., to connection with main system near Corpus Christi, Tex., about 26 miles, for crude oil transmission. New line will replace an existing 5½-in. line recently acquired from Crude Oil Pipe Line Co.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 21 for steel pipe; also for steel tubing and wrought iron pipe (Schedule 7649) for Eastern and Western Navy yards.

Elmira District Steam Corp., Elmira, N. Y., care of J. John Hassett, Keeney Theater Annex, attorney and representative, plans pressure pipe lines in Main, State, Church and Water Streets for steam distribution to group of commercial consumers in that area. Line connection will be made with steam power station at Mark Twain Hotel, West Gray Street, which will be source of supply. Arthur B. McLeod, 729 West Water Street, is engineer.

Magnolia Pipe Line Co., Esperson Building, Houston, Tex., an interest of Magnolia

Petroleum Co., same address, has authorized immediate construction of new 4½-in. welded steel pipe line from Corpus Christi, Tex., to San Antonio, Tex., about 138 miles, for gasoline transmission. Several booster stations will be built along route.

Spur, Tex., plans pressure pipe line system for natural gas distribution. Cost close to \$30,000. Financing in part has been arranged through Federal aid.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans pipe lines for gas distribution in district No. 875, recently created.

Glenwood Springs, Colo., plans high-pressure pipe line for main water supply from storage reservoir to connection with city waterworks station. Financing has been arranged through Federal aid.

Anglo-Canadian Oil Co., Ltd., Edmonton, Alta., is interested in a project now being considered by a British group, which will arrange financing, for new welded steel pipe line from Turner Valley, Alta., oil field district, to Port Arthur, Ont., close to 1500 miles, for crude oil transmission to a waterfront terminal to be built on Lake Superior at latter place. A continuous heating system will be installed for handling oil in transit and other operating facilities, including booster stations for large line capacity. Cost about \$35,000,000 with waterfront terminal and other structures.

CAST IRON PIPE

Tulsa, Okla., plans pipe line extensions and replacements in water system and other waterworks installation. Cost about \$100,500, of which \$61,882 will be secured through Federal aid.

Rugby, N. D., closes bids Nov. 13 for 1700 ft. of 6-in. pipe, pipe fittings, hydrants and other waterworks equipment.

North Royalton, Ohio, plans pipe line extensions in water system in Bunker and Ridge Roads and neighboring streets. Cost about \$50,000. Bond issue in that amount is being arranged.

Palmer Lake, Colo., plans about 3300 ft. of 10-in. pipe for main water supply from reservoir at Palmer Lake to town limits; also about 5440 ft. of 4-in. for new distribution lines in municipality, particularly in Pinecrest district. Financing is being arranged through Federal aid.

South Coast County Water District, Laguna Beach, Cal., plans pipe line extensions in system in part of Coast State Highway and other streets.

Hitchcock, Okla., plans water pipe lines and other waterworks installation. Cost about \$36,000. Bond issue in that amount has been approved. Alexander & Pollard, Terminal Building, Oklahoma City, Okla., are consulting engineers.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans water pipe line system in districts Nos. 1582 and 1600, recently created.

Bedford, Iowa, plans about 18,500 ft. of 6-in. pipe for main water line from source at Lake of Three Fires to municipality; also smaller pipe for distribution lines. Cost about \$50,000. Financing has been arranged through Federal aid.

Allegheny County Institutional District, County Office Building, Pittsburgh, will take bids soon for pipe lines for water system at County Home, Woodville. Cost about \$30,000. J. N. Chester Engineers, Inc., 210 East Parkway, N.S., is consulting engineer.

Montoursville, Pa., plans pipe line extensions in water system, including new 8-in. line for supply to plant of International Furniture Co., now in course of erection. M. L. Smith is borough engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 17 for 22 pieces of 14-in. inside diameter cast iron water pipe, each 16 ft. long; also for cast iron water pipe fittings (Schedule 3711).

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
1938						
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter ..	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter ..	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months ..	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.29
August	2,309,207	196,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter ..	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter ..	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.30
1st Quarter ..	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter ..	8,345,943	563,405	9,022,409	693,498	13.01	50.79
1st 6 months ..	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	2,893,916	229,380	3,162,534	715,505	4.42	52.40
August	3,469,453	246,952	3,763,418	849,530	4.43	62.22
September	3,881,564	297,128	4,231,310	988,624	4.28	72.41
3rd Quarter ..	10,244,933	773,460	11,157,262	849,753	13.13	62.23
9 Months	27,500,243	1,875,239	29,748,042	762,770	39.00	55.86
October	4,922,070	405,000	5,393,821	1,217,567	4.43	89.17

FABRICATED STEEL

NORTH ATLANTIC STATES AWARDS

- 2300 Tons, New York, 11th Avenue viaduct, W. 33rd-W. 35th Street, for New York Central Railroad, to American Bridge Co., Pittsburgh.
- 950 Tons, New York, apartment building, Park Avenue and 73rd Street, to Harris Structural Steel Co., Plainfield, N. J.
- 750 Tons, Newport, R. I., torpedo station assembly unit, to Bethlehem Steel Co., Bethlehem, Pa.; Tredennick-Billings Co., Boston, contractor.
- 650 Tons, Long Island City, N. Y., sugar warehouse for National Sugar Refining Co., to Ingalls Iron Works Co., Birmingham.
- 550 Tons, Cheektowaga, N. Y., grade-crossing elimination, to Bethlehem Steel Co., Buffalo, through C. P. Ward & Co., Rochester, general contractors.
- 170 Tons, Rochester, N. Y., apartment building for W. W. Vicinus, to American Bridge Co., Pittsburgh.
- 155 Tons, Brooklyn, Trommer Brewery wash house to an unnamed bidder.
- 150 Tons, Massena, N. Y., Aluminum Co. of America, building 124A, to an unnamed bidder.
- 150 Tons, Sharon, Pa., Westinghouse Electric & Mfg. Co., building extension to Keystone Engineering Co., Pittsburgh.
- 135 Tons, Springville, N. Y., Frye bridge, to Lackawanna Steel Construction Co., Buffalo.
- 120 Tons, Flushing, N. Y., St. Andrews Church, to Belmont Iron Works, Philadelphia.
- 100 Tons, Williamstown, Mass., theater to Haarmann Steel Co., Holyoke, Mass.; E. J. Pinney, Inc., Springfield, Mass., contractor.

THE SOUTH

- 2000 Tons, Calumet, La., bridge, project SP-6006, to Mount Vernon Bridge Co., Mount Vernon, Ohio.
- 1400 Tons, Shreveport, La., Commercial National Bank Building, to Ingalls Iron Works Co., Birmingham.
- 320 Tons, Georgetown, S. C., bridge, project 2511-A, to Virginia Bridge Co., Roanoke, Va.
- 200 Tons, Collier, W. Va., replacement of girders, bridges Nos. 35.03 and 34.39 for Pennsylvania Railroad, to American Bridge Co., Pittsburgh.
- 150 Tons, Lexington, Ky., housing project, to Snead Architectural Iron Works, Louisville, Ky.
- 115 Tons, Erlinger, Ky., State bridge over Woolper Creek, to Midland Structural Steel Co., Cicero, Ill.
- 100 Tons, Johnson City, Tenn., two tobacco warehouses, to Interstate Foundry Co., Anniston, Ala.

CENTRAL STATES

- 1955 Tons, Chicago, Western Avenue viaduct sup. structure, to American Bridge Co., Pittsburgh.
- 750 Tons, E. Peoria, Ill., power house addition for Central Illinois Light Co., to Wisconsin Bridge & Iron Co., Milwaukee.
- 625 Tons, Brompton, Iowa, Milwaukee Road viaduct, to Wisconsin Bridge & Iron Co., Milwaukee.
- 625 Tons, Peru, Ind., State bridge No. 1842, to Pan-American Bridge Co., New Castle, Ind.
- 360 Tons, Detroit, stock cellar building for Tivoli Brewing Co., to Whitehead & Kales Co., Detroit.
- 355 Tons, Bloomington, Ill., State highway bridge, to A. F. Anderson Iron Works Co., Chicago.
- 315 Tons, various locations, bridges for Burlington Railroad, to Bethlehem Steel Co., Bethlehem, Pa.
- 327 Tons, Lincoln, Neb., court house extension, to Omaha Steel Works, Omaha.
- 270 Tons, State of Minnesota, bridge No. 5871, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.
- 233 Tons, Mapleton, Iowa, Milwaukee Road bridge, to American Bridge Co., Pittsburgh.
- 235 Tons, Newark, Ohio, extension to Corning Fiberglas plant. About half of tonnage awarded to Indiana Bridge Co., Muncie, Ind., through C. M. Barr, Columbus, remainder to an unnamed fabricator.
- 210 Tons, Cicero, Ill., factory building, Chicago Extruded Metals Co., to Midland Structural Steel Co., Cicero, Ill.
- 205 Tons, Akron, Ohio, ice arena, to Burger Iron Co., Akron.
- 200 Tons, Dunklin County, Mo., bridges, to Reynolds Mfg. Co., Springfield, Mo.
- 180 Tons, McLeod, Minn., bridge for Milwaukee Road, to Minneapolis-Moline Power Implement Co.

- 170 Tons, Midland, Ohio, State bridge, to Case-Crane-Kilbourne-Jacobs Co., Columbus, Ohio.
- 170 Tons, Moravia, Iowa, Milwaukee Road bridge to Minneapolis-Moline Power Implement Co., Minneapolis.
- 159 Tons, Rossville, Ill., bridge, to Midland Structural Steel Co., Cicero, Ill.

WESTERN STATES

- 1150 Tons, Fort Peck Dam, Mont., trash racks, bulkheads, etc., to Bethlehem Steel Co., San Francisco.
- 650 Tons, Seattle, Columbia Steel Co. warehouse, to Columbia Steel Co., San Francisco.
- 300 Tons, Sacramento, Cal., telephone building, to Bethlehem Steel Co., San Francisco.
- 265 Tons, Pueblo, Colo., Missouri Pacific Railroad bridge, to Kansas City Structural Steel Co., Kansas City, Kan.
- 225 Tons, San Francisco, livestock pavilion, to Golden Gate Iron Works, San Francisco.
- 125 Tons, Albany, Cal., telephone building, to Moore Dry Dock Co., Oakland, Cal.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 7000 Tons, Brooklyn, turret and erection shops building for Navy Yard.
- 3500 Tons, Forest Hills, N. Y., high school.
- 2100 Tons, Washington, Federal office and drafting building.
- 600 Tons, Philadelphia, Lit Brothers store.
- 325 Tons, New York, dumping facilities for city.
- 250 Tons, Carney's Point, N. J., polymer finishing and storage building for E. I. du Pont de Nemours & Co.
- 210 Tons, Philadelphia, building R11, for Reinous Products & Chemical Co.
- 210 Tons, Springfield, Mass., telephone building for New England Telephone & Telegraph Co.
- 170 Tons, Brooklyn, foundations and floors, building No. 18, for Navy Yard.
- 169 Tons, Columbia County, Pa., highway bridge, route No. 239.
- 133 Tons, Lehigh County, Pa., high bridge, route No. 153.

THE SOUTH

- 250 Tons, Jefferson, Ky., State underpass.
- 200 Tons, Ponca City, Okla., exchanger and heaters for Max B. Miller Co.

CENTRAL STATES

- 900 Tons, alterations to bridges for Milwaukee Road.
- 600 Tons, Cedar Rapids, Iowa, boiler house addition, Iowa Light & Power Co.; bids Nov. 10.
- 570 Tons, State of Illinois, three bridges; bids Nov. 10.
- 385 Tons, State of Wisconsin, three bridges; bids Nov. 14.
- 165 Tons, Riverton, Wyo., bridge; bids Nov. 14.
- 155 Tons, Jefferson, Wis., State bridge No. 666.
- 150 Tons, Hardin County, Ohio, State bridge; bids Nov. 28.
- 140 Tons, Council Bluffs, Iowa, machine shop and engine house addition for Chicago & North Western Railway Co.
- 135 Tons, Terre Haute, Ind., garage for Terre Haute City Lines.
- 125 Tons, Walworth, Wis., State bridge A-472-2/3.
- 110 Tons, Cleveland, building for Producers' Milk Co.; bids in.

WESTERN STATES

- 1664 Tons, Antler, Cal., Sacramento River bridge; bids November 22.
- 1400 Tons, San Diego, Cal., Consolidated Aircraft plant.
- 400 Tons, La Verne, Cal., water softening plant; Griffith Co., Los Angeles, low bidder on general contract.
- 375 Tons, Nacimiengo, Cal., Salinas River bridge; bids Nov. 22.
- 243 Tons, Snohomish County, Wash., Sultan River bridge; bids Nov. 14.
- 163 Tons, Seattle, 6th Avenue N. E. undercrossing.

FABRICATED PLATES

AWARDS

- 3000 Tons, Port Arthur, Tex., platform and stairs for Gulf Oil Corp., to Mosher Steel Co., Dallas, Tex.
- 150 Tons, Neville Island, Pa., 10 tanks for Vulcan Detinning Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PENDING PROJECTS

- 245 Tons, Portland, Ore., pontoons for Port of Portland.

SHEET PILING

AWARDS

- 1385 Tons, Cleveland, cut No. 5B, contract No. 13, Cuyahoga River straightening, to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Dredge & Dock Co., Cleveland.
- 1026 Tons, Cleveland, bulkhead, cut No. 9B, contract No. 20, Cuyahoga River straightening, to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Dredge & Dock Co., Cleveland.
- 357 Tons, Cleveland, lake front ramp of Main Street bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through National Engineering & Contracting Co., Cleveland.

REINFORCING STEEL

ATLANTIC STATES

AWARDS

- 200 Tons, Rensselaer, N. Y., building for General Analine Co., to Truscon Steel Co., through White Construction Co., contractors.

CENTRAL STATES

- 1800 Tons, Chicago, General Electric Co. building, to Bethlehem Steel Co., Bethlehem, Pa., through James Stewart Co., contractor.
- 1100 Tons, Savanna, Ill., powder magazines, to Bethlehem Steel Co., Bethlehem, Pa., through Midwest Construction & Asphalt Co., contractor.
- 1000 Tons, Peoria, Ill., housing project, to Laclede Steel Co., St. Louis.
- 200 Tons, Pekin, Ill., reservoir, to Laclede Steel Co., St. Louis, through G. E. Tillman, contractor.
- 200 Tons, Madison, Wis., Clarendon Corp. apartments, to Bethlehem Steel Co., Bethlehem, Pa.
- 160 Tons, Cleveland, lake front ramp, Main Street bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through National Engineering & Contracting Co., Cleveland.
- 128 Tons, Milwaukee, for municipality to Worden-Allen Co., Milwaukee.

WESTERN STATES

- 322 Tons, Hickam Field, T. H., warehouses, to Bethlehem Steel Co.; Los Angeles, through Robert E. McKee, Los Angeles, contractor. Tonnage includes 75 tons of fabric.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 1800 Tons, Philadelphia, Lit Brothers store.
- 700 Tons, Bedford County, Pa., two turnpike projects.
- 450 Tons, Queens, N. Y., E. 19th Street sewer.

SOUTH AND CENTRAL

- 500 Tons, State of Missouri, highway projects; bids Nov. 17.
- 500 Tons, Terre-Haute, Ind., Quaker Maid Co. plant.
- 270 Tons, Harvard, Ill., bridge.
- 261 Tons, Zanesville, Ohio, housing project; Youngstown Builders' Syndicate low bidder (previously reported).
- 250 Tons, Washington, Piney Branch sewer, unit No. 6.
- 200 Tons, Detroit, Weber apartments.
- 182 Tons, Panama Canal, Schedule 3715; bids Nov. 10.
- 150 Tons, Minneapolis, Minn., Bunge Grain Co. building.
- 150 Tons, MacComb, Miss., housing project, W. T. Reed, Belzonia, Miss., low bidder on general contract (previously reported).
- 130 Tons, Evansville, Ind., Mead Johnson Co. building.
- Unstated tonnage, Chicago, addition to Visitation high school, bids Nov. 14.

WESTERN STATES

- 2800 Tons, La Verne, Cal., water softening plant; Griffith Co., Los Angeles, low bidder on general contract.
- 635 Tons, Antler, Cal., Sacramento River bridge; bids Nov. 22.
- 565 Tons, Nacimiengo, Cal., Salinas River bridge; bids Nov. 22.
- 470 Tons, Rutledge, Tex., Marshall Ford Dam (Invitations A-46898-A and A-46811-A); bids in.
- 218 Tons, Oakland, Cal., Coca Cola bottling plant.
- 207 Tons, Alameda, Cal., Navy base ramp; Clyde W. Wood, Los Angeles, low bidder on general contract; includes 67 tons of mesh.
- 185 Tons, Santa County, Cal., Bass Hill viaduct; bids Nov. 22.
- 160 Tons, Sawyer, Wash., Yakima project (Invitation A-33895-A); bids in.
- 125 Tons, Lamar, Colo., relocation of Atchison, Topeka & Santa Fee Railroad; bids Nov. 13.
- 110 Tons, Snohomish County, Wash., Sultan River bridge; bids Nov. 14.
- 105 Tons, Bowie, Ariz., highway work on Benson-Stearns Pass highway; bids Nov. 16.

...NON-FERROUS...

... Non-ferrous buying is at a moderate pace; shipment trend is still upward ... Tin quotas pushed up to 100 per cent; Straits shipments reach all-time peak ... October spelter shipments amounted to 73,327; stocks at end of the month are equal to less than one month's shipments.

NEW YORK, Nov. 6—Inquiry for non-ferrous metals in the past week was in very moderate volume and such sales as were consummated were mostly a matter of rounding off nearby schedules. Copper sales were slightly higher, but the difficulty of obtaining nearby metal continues to act as a deterrent to greater activity. Producers are still quoting 12.50c. per lb., Connecticut

Valley, but little material is available at this price for nearby shipment. In the open market prompt metal is obtainable in limited amounts at 13c. per lb., with 12.80c. to 12.85c. being quoted on two to three months' shipment. There was some export buying during the week at 13c. per lb., f.a.s. It is understood that none of the 150,000 tons recently bought by France will come from domestic mines.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 1	Nov. 2	Nov. 3	Nov. 4	Nov. 6
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	Nominally 54c. to 55c.				
Zinc, East St. Louis ²	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	57.50c.	Nominal
Copper, Lake	13.75c.	Nominal
Copper, electro	13.50c.	Nominal
Copper, castings	13.125c.	Nominal
*Copper sheets, hot-rolled	20.87c.	20.87c.
*Yellow brass sheets ..	19.06c.	19.06c.
*Seamless brass tubes..	21.81c.	21.81c.
*Seamless copper tubes.	21.37c.	21.37c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.875c.	8.125c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	34.25c.	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.125c.	10.75c.
Copper, hvy. and wire..	9.125c.	9.50c.
Copper, light and bottoms	8.125c.	8.625c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	9.25c.	10.125c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or comp. turnings	9.125c.	9.625c.
Lead, heavy	4.375c.	4.75c.
Cast aluminum	8.75c.	9.75c.
Sheet aluminum	14.75c.	15.75c.
Zinc	3.375c.	4.625c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$140 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

Zinc

Outside of a sporadic carlot, buyers showed very little interest during the past week. Shipments, however, continued to move into consumption at a record-breaking pace. In October 73,327 tons was shipped, an increase of 3903 tons over September and a total far exceeding any monthly figure of the 1929 or 1937 peaks. Production in October rose to 50,117 tons from 42,225 tons in September. The unusually high rate of shipments in the past month reduced stocks to 72,405 tons, or a quantity less than October's shipments. Quotations are unchanged at 6.89c. per lb., New York.

Lead

Sales last week showed a further slackening, but most producers were still able to sell their intake. With November fairly well sold out, chief interest is in December. Shipments continue at a very high rate and present indications are that the past month will closely approach the 66,000-ton mark. New business is still being done on the basis of 5.50c. per lb., New York. U. S. Stocks of lead in October fell 17,399 tons to 191,453 tons, roughly equivalent to three months' shipments.

Tin

The enormous demand for tin in this country last month, which in face of the small sales in the East boosted prices paid in New York substantially above the level fixed by the British Government, drew record-breaking shipments from the Straits in that month, according to recent statistics. The shipments, at 14,874 tons, exceeded the previous high by almost 50 per cent. Domestic shipments also reflected the better demand, increasing from 5050 in September to 6040 in October. These statistics, together with the announcement that production quotas had been boosted to 100 per cent for the current quarter from previous level of 70 per cent, had a quieting effect upon the market here and at the end of the week prompt Straits was quoted about one cent below the level price of a week ago. The increase in quotas should make an additional 5000 tons available each month.

October Average Prices

The average prices of the major non-ferrous metals in October, based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	12.44c.
Lake copper, Eastern delivery..	12.44c.
Straits tin, spot, New York.....	Nominal
Zinc, East St. Louis.....	6.50c.
Zinc, New York.....	6.89c.
Lead, St. Louis.....	5.35c.
Lead, New York.....	5.50c.

Copperweld Steel Co., Pittsburgh, reports net income of \$219,129 for the quarter ended Sept. 30. After allowing for a full quarter's dividend requirements on the preferred stock, net income was equal to 45c. a common share. The company declared a dividend of 20c. on its common stock and regular quarterly disbursement of 62½c. on the preferred, both payable Dec. 10 to record Dec. 1.

IRON AND STEEL SCRAP

NOV. 7—While most district markets appear to be marking time pending new mill buying on a larger scale, several definite signs of weakness in scrap prices have appeared. Railroad lists the first of the month brought lower prices than in the early part of October, although some of the larger roads have yet to offer their lists. Bundles at Philadelphia similarly brought a lower price, and a weakening of this item is predicted at Detroit before the week is out. At Pittsburgh, bundles are quoted down \$1 as a result of a corresponding decline in No. 1 heavy melting steel, based on small consumer sales and broker covering. The softness there is largely due to the continued absence of any large scale buying on the part of the mills, despite the high rate of operations and backlog of steel orders. About the only mill sale of any size reported this week involved 2000 tons of No. 2 steel, bought by a St. Louis consumer at 25c. below last week's market price. The composite price is down 33c. to \$20.63 after registering a small gain the week before.

Aside from bundles, Detroit prices are generally stronger. Boston dealer buying prices also reflect strength in local markets. Export buying prices are firm but unchanged. New business is looked for shortly from the Orient and from individual European countries now that the International Scrap Cartel has ceased to function.

Pittsburgh

The corrective movement which began in this market four weeks ago continued last week with several reductions being made in the various grades of scrap. Small consumer sales of No. 1 heavy melting steel have been made into consumption within the past week at \$21.50 to \$22 a ton, the former price representing a small sale made a few days ago. Brokers are able to get an occasional car of No. 1 at \$21 but for the most part have, up until a few days ago, found it necessary to pay \$21.50 a ton. The continued absence of consumers from the market has brought about additional softness within the past week and this trend is substantiated by sales of railroad heavy melting which were somewhat below the closings of a month or two ago. The B.&O. heavy melting steel is reported to have been sold f.o.b. tracks for \$21.50 a ton. Portion of the P. & L.E. list covering heavy melting went for \$22.50 a ton to a broker. Pending further clarification on railroad heavy melting steel which will be available after the Pennsylvania list closes this week, this grade is quotable at \$22 to \$23 a ton. No. 1 heavy melting steel is quotable at \$21 to \$22 a ton, down \$1 from a week ago. After

a brief spurt, machine shop turnings are softer this week. The future trend of the market remains highly problematical.

Chicago

With the leading buyer temporarily out of the market, trading has become rather light. The last confirmed mill sale was at \$18.75 and brokers are having to pay \$18.50 to cover. Current prices seem to be bringing out material at a good rate and no shortages are evident. The prospect of water shipment to Canadian ports is intriguing some brokers who foresee a shortage of scrap in that country if the Dominion steel producers continue at capacity.

Philadelphia

Mixed trends rule the market here so far as the prime steel making grades are concerned. Buyers' price views, substantiated in part by some recent offerings, indicate that current published quotations (which are essentially nominal in the absence of important mill buying) are representative of what would have to be paid on new commitments. On the other hand, brokers have been forced lately to pay the lower range of these quoted prices in covering operations, particularly for No. 2 steel. There has been a small amount of activity in old bundles, re-rolling rails, and blast furnace borings, in each case at prices slightly above previous levels.

Cleveland

Scrap continues to mark time here. Ingot output is well maintained, but with the vessel movement brisk as the season's cleanup approaches, dealers selling by rail have adopted a waiting attitude. Ample stocks of lighter grades have greatly curtailed activity in those items. Steel on the principal local railroad list brought around \$21.50 at a downstate on-line point, a decline from last month's yield.

Youngstown

Quotations continue unchanged here this week on the basis of moderate activity. Mills are using generous quantities weekly but the movement from Cleveland is brisk, and includes scrap brought by vessel to that city and transshipped to a central Ohio point. Some dealers are not particularly interested in transactions at today's price levels, believing the market will improve through future tonnage sales.

Cincinnati

Early in the past week there was a slightly sagging tendency in the market, but with the passing of the bill to lift embargo on war supplies, the market undertone strengthened. Improvement, however, was not strong enough to raise prices since there is still some doubt in dealers' minds as to just what the situation will be in the first quarter. Currently, therefore, dealers' bids are being well maintained although mill interest in purchasing is still not brisk. Reports of railroad sales at lower prices has tended to curb bullish tendencies.

St. Louis

A district melter bought approximately 2000 tons of No. 2 heavy melting steel at the present market, 25c. a ton below last week's prices. Selected heavy melting was up 25c. A few other changes were noted, and it is believed there will be few price changes for the remainder of the year. Heavier offerings are coming here from the railroads, as they open their shops which have been shut down for several years. No big buying is expected before Jan. 1. Railroad lists: Gulf Coast Lines, 1400 tons; Wabash, 2700 tons; Missouri Pacific, 1300 tons; St. Louis Southwestern, 200 tons; Ann Arbor, 100 tons.

Detroit

Because of broker activity, heavy melting steel scrap prices in the Detroit area were advanced 50c. a ton in the early part of this week. Blast furnace scrap showed a softening in price, with one of the specialties actually dropping \$1. Lack of foundry business, attributable to the prolonged Chrysler strike, caused a dislocation in foundry scrap items but general opinion that lifting of the embargo would increase manufacturing has kept prices near the previous level.

New York

The market remains steadily unchanged in New York as it has for some time past, this market having failed to reflect the general decline that took place in scrap prices a few weeks back. Export shipments are going forward slowly to Europe, principally to Italy under revised contracts separately negotiated, since the International Scrap Convention in London has ceased to function as a buying cartel for all nations. New orders are expected from Great Britain in the near future. Shipments to Japan are much freer than to Europe and new buying is looked for from this source within the next 10 days.

Boston

Increased buying of material for export and an urgent demand for certain materials from New England consumers have created a firmer market. However, any improvement in prices has been for domestic delivery, the export range remaining unchanged. Considerably better than \$20 a ton, delivered, has been paid out for cut rails by New England consumers, and orders for strictly No. 1 steel have been placed at a price to be determined on date of shipment.

Toronto

Firmer prices continue to feature the Canadian scrap markets, with Toronto dealers marking up new loose clippings \$1 per ton, now paying \$7 for this material. Cast borings and steel turnings each gained 25c. per ton to \$5.75 and \$6.25 per gross ton respectively. Recent price advances have stimulated offerings. Automobile wreckers are offering more freely and there is a good supply of No. 2 cast scrap from this source. No. 1 heavy melting steel and No. 1 cast scrap, however, continue scarce and dealers are offering premium prices for these lines.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$21.00 to \$22.00
Railroad heavy melting	22.00 to 23.00
No. 2 heavy melting	19.50 to 20.00
Scrap rails	23.00 to 24.00
Rails 3 ft. and under	26.00 to 26.50
Comp. sheet steel	21.00 to 22.00
Hand bundled sheets	20.00 to 21.00
Heavy steel axle turn.	19.50 to 20.00
Machine shop turnings	14.50 to 15.00
Short shov. turnings	16.50 to 17.00
Mixed bor. & turn.	14.50 to 15.00
Cast iron borings	14.50 to 15.00
Cast iron carwheels	21.50 to 22.00
Heavy breakable cast.	18.00 to 18.50
No. 1 cupola cast	22.00 to 22.50
RR. knuckles & coup.	26.50 to 27.00
Rail coil springs	26.50 to 27.00
Rail leaf springs	26.50 to 27.00
Rolled steel wheels	26.50 to 27.00
Low phos. billet crops	28.50 to 29.00
Low phos. punchings	25.50 to 26.00
Low phos. heavy plate	25.50 to 26.50
Railroad malleable	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$21.50 to \$22.00
No. 2 hvy. mtng. steel	19.50 to 20.00
Hydraulic bund., new	21.50 to 22.00
Hydraulic bund., old	18.50 to 19.00
Steel rails for rolling	23.00 to 23.50
Cast iron carwheels	22.00 to 22.50
Hvy. breakable cast.	20.50 to 21.00
No. 1 cast	24.00 to 24.50
Stove plate (steel wks)	17.50 to 18.00
Railroad malleable	22.00
Machine shop turn.	15.00 to 15.50
No. 1 blast furnace	13.50 to 14.00
Cast borings	13.50 to 14.00
Heavy axle turnings	17.00 to 17.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	26.00
Rolled steel wheels	26.00
Steel axles	24.50 to 25.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
No. 1 forge fire	16.50 to 17.00
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mtng. steel	\$18.50 to \$18.75
Auto. hvy. mtng. steel alloy free	17.00 to 17.50
No. 2 auto steel	14.00 to 14.50
Shoveling steel	18.50 to 18.75
Factory bundles	17.50 to 18.00
Dealers' bundles	16.50 to 17.00
No. 1 busheling	17.00 to 17.50
No. 2 busheling, old	8.00 to 8.50
Rolled carwheels	21.00 to 21.50
Railroad tires, cut	21.25 to 21.75
Railroad leaf springs	20.50 to 21.00
Steel coup. & knuckles	20.50 to 21.00
Axle turnings	17.00 to 17.50
Coil springs	21.50 to 22.00
Axle turn. (elec.)	19.00 to 19.50
Low phos. punchings	22.00 to 22.50
Low phos. plates 12 in. and under	21.50 to 22.00
Cast iron borings	11.00 to 11.50
Short shov. turn.	12.00 to 12.50
Machine shop turn.	11.00 to 11.50
Rerolling rails	21.00 to 21.50
Steel rails under 3 ft.	21.50 to 22.00
Steel rails under 2 ft.	22.00 to 22.50
Angle bars, steel	21.00 to 21.50
Cast iron carwheels	17.25 to 17.75
Railroad malleable	21.00 to 21.50
Agric. malleable	17.00 to 17.50

Per Net Ton	
Iron car axles	\$23.75 to \$24.25
Steel car axles	22.00 to 22.50
Locomotive tires	17.00 to 17.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast.	16.00 to 16.50
Clean auto. cast	16.50 to 17.00
No. 1 railroad cast.	15.50 to 16.00
No. 1 agric. cast.	14.00 to 14.50
Stove plate	12.00 to 12.50
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$20.50 to \$21.00
No. 2 hvy. mtng. steel	19.00 to 19.50
Low phos. plate	23.50 to 24.00
No. 1 busheling	19.50 to 20.00
Hydraulic bundles	20.00 to 20.50
Machine shop turn.	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$19.00 to \$19.50
No. 2 hvy. mtng. steel	18.00 to 18.50
Comp. sheet steel	18.50 to 19.00
Light bund. starlings	15.50 to 16.00
Drop forge flashings	17.50 to 18.00
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.75 to 13.25
No. 1 busheling	18.25 to 18.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	26.00 to 26.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cupola cast	21.50 to 22.00
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	22.75 to 23.25
Railroad malleable	24.00 to 24.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$20.50 to \$21.00
No. 2 hvy. mtng. steel	18.50 to 19.00
Scrap rails	21.00 to 21.50
New hvy. b'nded sheets	18.50 to 19.00
Old hydraul. bundles	17.50 to 18.00
Drop forge flashings	18.50 to 19.00
No. 1 bushelings	13.50 to 14.00
Machine shop turn.	13.00 to 13.50
Shov. turnings	15.00 to 15.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	24.00 to 25.00
Coil & leaf springs	24.00 to 25.00
Rolled steel wheels	24.00 to 25.00
No. 1 machinery cast.	20.00 to 20.50
No. 1 cupola cast.	19.00 to 19.50
Stove plate	16.00 to 16.50
Steel rails under 3 ft.	23.50 to 24.00
Cast iron carwheels	21.00 to 21.50
Railroad malleable	21.50 to 22.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$18.00 to \$18.50
No. 1 hvy. melting	16.50 to 17.00
No. 2 hvy. melting	15.50 to 16.00
No. 1 locomotive tires	18.00 to 18.50
Misc. stand. sec. rails	18.00 to 18.50
Railroad springs	21.00 to 21.50
Bundled sheets	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.00 to 7.50
Machine shop turn.	8.00 to 8.50
Heavy turnings	13.50 to 14.00
Rails for rolling	20.00 to 20.50
Steel car axles	21.00 to 21.50
No. 1 RR. wrought	12.50 to 13.00
No. 2 RR. wrought	16.50 to 17.00
Steel rails under 3 ft.	21.00 to 21.50
Steel angle bars	20.00 to 20.50
Cast iron carwheels	20.00 to 20.50
No. 1 machinery cast.	18.00 to 18.50
Railroad malleable	17.50 to 18.00
No. 1 railroad cast.	15.00 to 15.50
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mtng. steel	\$16.00 to \$16.50
No. 2 hvy. mtng. steel	14.00 to 14.50
Scrap rails for mtng.	20.50 to 21.00
Loose sheet clippings	11.50 to 12.00
Hydrau. b'nded sheets	15.50 to 16.00
Cast iron borings	6.00 to 6.50
Machine shop turn.	7.00 to 7.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	5.00 to 5.50
Rails for rolling	21.50 to 22.00
No. 1 locomotive tires	17.50 to 18.00
Short rails	23.00 to 23.50
Cast iron carwheels	17.50 to 18.00
No. 1 machinery cast.	19.00 to 19.50
No. 1 railroad cast.	17.50 to 18.00
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Agricul. malleable	15.50 to 16.00
Railroad malleable	18.50 to 19.00
Mixed hvy. cast.	16.50 to 17.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$18.00
Scrap steel rails	20.00
Short shov. turnings	9.50
Stove plate	\$11.00 to 12.00
Steel axles	22.00
Iron axles	22.00
No. 1 RR. wrought	16.00
Rails for rolling	22.00 to 23.00
No. 1 cast	18.00
Tramcar wheels	18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mtng. industrial steel	\$16.00 to \$16.50
No. 2 hvy. mtng. steel	15.50 to 16.00
Borings and turnings	9.50 to 10.00
Long turnings	8.50 to 9.00
Short shov. turnings	11.00 to 11.50
No. 1 machinery cast.	16.00 to 16.50
Automotive cast	17.50 to 18.00
Hvy. breakable cast.	13.00 to 13.50
Stove plate	11.00 to 11.50
Hydraul. comp. sheets	17.50 to 18.00
New factory bushel.	15.00 to 15.50
Sheet clippings	12.50 to 13.00
Flashings	14.50 to 15.00
Low phos. plate scrap	16.50 to 17.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mtng. steel	\$16.50 to \$17.00
No. 2 hvy. mtng. steel	13.50 to 14.50
Hvy. breakable cast.	16.50 to 17.00
No. 1 machinery cast.	16.50 to 17.50
No. 2 cast	15.50 to 16.00
Stove plate	13.50 to 14.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long.	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings	9.00 to 10.00
Cast borings	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	9.00 to 9.50
Light iron	5.00 to 5.50

Per gross ton, delivered local foundries:

No. 1 machin. cast.	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$14.75 to \$15.00
Machine shop turn.	8.75 to 9.25
Mixed bor. & turn.	7.50 to 7.75
Bun. skeleton long.	12.50 to 12.75
Shafting	19.00 to 19.50
Cast bor. chemical	9.50 to 10.00
Per gross ton delivered consumers' yards:	
Textile cast	\$18.00 to \$19.00
No. 1 machine cast	18.00 to 19.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mtng. steel	\$16.25 to \$16.75
No. 2 steel	15.25 to 15.50

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mtng. steel	\$14.35
No. 2 hvy. mtng. steel	13.35

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
No. 1 hvy. mtng. steel	\$11.25 \$10.75
No. 2 hvy. mtng. steel	10.00 9.50
Mixed dealers steel	9.25 8.75
Drop forge flashings	10.25 9.75
New loose clippings	7.00 6.00
Busheling	5.50 5.00
Scrap pipe	8.00 7.50
Steel turnings	6.25 5.50
Cast borings	5.75 5.00
Machinery cast	18.00 17.50
Dealers cast	17.00 16.50
Stove plate	12.00 11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mtng. steel	\$17.00 to \$17.50
No. 2 hvy. mtng. steel	15.50 to 16.50
No. 2 cast	15.00 to 15.50
Stove plate	13.50 to 14.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mtng. steel	\$18.00 to \$18.25
No. 2 hvy. mtng. steel	17.00 to 17.25
Rails (scrap)	18.25 to 18.25

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mtng. steel	\$20.50 to \$20.75
No. 2 hvy. mtng. steel	19.25 to 19.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Re-rolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Re-rolling \$34.90
Forging quality 40.90

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
Pittsburgh, Chicago or Cleveland \$43.00
Worcester, Mass. 45.00
Birmingham 43.90
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.60c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.60c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 30,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c. to 2.35c.
Philadelphia, del'd 2.15c. to 2.40c.
New York, del'd 2.29c. to 2.54c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'g 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton \$40.00
Light rails (from rail steel) per gross ton 39.90

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports. 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.00c.
Detroit, delivered 2.10c.
Philadelphia, delivered 2.17c.
Granite City 2.10c.
On cars dock Pacific ports 2.50c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports 4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary \$5.00
Standard cokes, Granite City 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box

Granite City \$4.40
Pittsburgh or Gary 4.80

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C. \$12.00
15-lb. coating I.C. 14.00
20-lb. coating I.C. 15.00
25-lb. coating I.C. 16.00
30-lb. coating I.C. 17.25
40-lb. coating I.C. 19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.00c.
Detroit, delivered 2.10c.
On cars dock Pacific ports 2.60c.

Cooperage Stock

Pittsburgh & Chicago 2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh

and

Cleveland and Worcester

Carbon 0.26-0.50% 2.80c. 3.00c.
Carbon 0.51-0.75 4.30c. 4.50c.
Carbon 0.76-1.00 6.15c. 6.35c.
Carbon 1.01-1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.70

	Base per 100 Lb.
Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Twisted barless wire	3.40
Woven wire fence, No. 11 and heavier, base col.	70
Woven wire fence, lighter than No. 11, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/8	56	3/4	36
1/4	59	1/2	43 1/2
3/8	63 1/2	3/4	54
1/2	66 1/2	1	60 1/2
3/4	68 1/2	1 1/4	60 1/2
1	68 1/2	2	60 1/2

Lap Weld	
In.	Black Galv.
2	61
2 1/2	63
3	66
3 1/2	66 1/2
4	66 1/2
5	66 1/2
6	66 1/2
7	66 1/2
8	66 1/2
9	66 1/2
10	66 1/2
11	66 1/2
12	66 1/2

Butt weld, extra strong, plain ends	
In.	Black Galv.
1/8	54 1/2
1/4	56 1/2
3/8	61 1/2
1/2	65 1/2
3/4	65 1/2
1	67

Lap weld, extra strong, plain ends	
In.	Black Galv.
2	59
2 1/2	63
3	66 1/2
3 1/2	66 1/2
4	66 1/2
5	66 1/2
6	66 1/2
7	66 1/2
8	66 1/2
9	66 1/2
10	66 1/2
11	66 1/2
12	66 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of \$1 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	10.67
1 1/4 in. o.d.	13 B.W.G.	11.70
1 1/2 in. o.d.	13 B.W.G.	13.42
1 3/4 in. o.d.	13 B.W.G.	15.03
2 in. o.d.	13 B.W.G.	16.76
2 1/4 in. o.d.	13 B.W.G.	18.45
2 1/2 in. o.d.	12 B.W.G.	20.21
2 3/4 in. o.d.	12 B.W.G.	21.42
3 in. o.d.	12 B.W.G.	22.48
3 1/2 in. o.d.	11 B.W.G.	28.37
4 in. o.d.	10 B.W.G.	35.20
4 1/2 in. o.d.	10 B.W.G.	42.04
5 in. o.d.	9 B.W.G.	54.01
6 in. o.d.	7 B.W.G.	82.93

Extras for less carload quantities:

	Base	5%	10%	30%	45%	65%
40,000 lb. or ft. over						
30,000 lb. or ft. to 39,999 lb. or ft.						
20,000 lb. or ft. to 29,999 lb. or ft.						
10,000 lb. or ft. to 19,999 lb. or ft.						
5,000 lb. or ft. to 9,999 lb. or ft.						
2,000 lb. or ft. to 4,999 lb. or ft.						
Under 2,000 lb. or ft.						

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
*6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, \$3 extra 4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45, Birmingham, and \$38.80 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. and 6 in. and smaller	68 1/2
Larger and longer up to 1 in.	66
1 1/2 in. and larger	64
Lag bolts	66
Flow bolts, Nos. 1, 2, 3, and 7	68 1/2
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
1/2 in. and smaller	67
9/16 in. to 1 in. inclusive	64
1 1/2 in. and larger	62

On the above items with the exception of flow bolts, there is an additional allowance of 10 per cent for full container quantities.
On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.	
1/2 in. and smaller	67
9/16 to 1 in.	64
1 1/2 in. and larger	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose	72 1/2
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83 1/2
On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.10
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10
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Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread 1/4 in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base.....2.70c.
Delivered, Detroit.....2.80c.
S.A.E. Alloy Series
Numbers
200 (1/4% Nickel).....\$0.35

2100 (1 1/4% Nickel)	\$0.75
2300 (3 1/4% Nickel)	1.55
2500 (5% Nickel)	2.25
31 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.30
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel	
No. 304	No. 302
Forging billets	21.25c.
Bars	25c.
Plates	29c.
Structural shapes	25c.
Sheets	36c.
Hot-rolled strip	23.50c.
Cold-rolled strip	30c.
Drawn wire	25c.

Straight Chrome	
No. 410	No. 430
Bars	18.50c.
Plates	21.50c.
Sheets	26.50c.
Hot stp.	17c.
Cold stp.	22c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	19c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	31s. to 32s.
Steel bars, open hearth	Nominal
Beams, open hearth	Nominal
Channels, open hearth	Nominal
Angles, open hearth	Nominal
Black sheets, No. 24 gage	Nominal
Galvanized sheets, No. 24 gage	Nominal

CONTINENTAL

Per Gross Ton, Go'd & f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	\$5 10s.
Steel bars, merchants	\$5 5s.
Sheet Bars	Nominal
Plate 1/4 in. and up	\$5 7s.
Plate 3/16 in. and 5 mm.	\$5 13s.
Sheet 1/4 in.	\$5 9s. 6d.
Beams, Thomas	\$4 18s.
Angles (Basic)	\$4 18s.
Hoops and strip, base	\$5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati ..	23.06
Northern, delivered, Cincinnati ..	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ..	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo....\$28.50

Gray Forge

Valley or Pittsburgh furnace..\$22.50

Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$100.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	\$69.50*
50% (ton lots in 50 gal. bbl.) ..	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.) ..	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio Per Gross Ton

10.00 to 10.50%	\$32.50
For each additional 0.50% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. per ton.	

For each unit of manganese over 2%, \$1 per ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$26.50
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For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

8% carbon	\$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads....	\$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovanadium, contract, per lb. contained V., delivered	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	\$2.25†
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville	\$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are \$5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% ...	\$5.25
Old range, non-Bessemer, 51.50% ..	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50% ..	4.95
High phosphorus, 51.50%	4.85

Foreign Ores*

C.i.f. Philadelphia or Baltimore Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	44c.
Man., African, Indian, 44-48%	43c.
Man., African, Indian, 49-51%	45c.
Man., Brazilian, 46 to 48%	40c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered. \$23.00 to \$24.00	
Tungsten, domestic, scheelite delivered	25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$17.00
Rhodesian, 45%	21.00
Rhodesian, 48%	25.00
Turkish, 48-49%	26.00
Turkish, 45-46%	23.00
Turkish, 40-41%	18.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	\$26.00
48-49%	25.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$22.00
Domestic, f.o.b. Ohio River landing barges	\$22.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines. \$20.00 to 22.00	
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	\$22.50 to \$23.50
Domestic No. 1 ground bulk, 96 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	\$31.60

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J.	4.375c.
No. 6, f.o.b. Bayonne, N. J.	2.74c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$5.00 to \$5.50
Foundry, f.o.b. Connells-ville, Prompt	5.75 to 6.25
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England....	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland ..	11.05
Foundry, by - product delivered Cincinnati ..	10.50
Foundry, Birmingham..	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Base per Lb.	
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.75c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb. On reinforcing bars base applies to orders of less than one ton and includes switching and starting charge. All above prices for delivery within the Pittsburgh switching district.

NEW YORK

Base per Lb.	
*Plates, 1/4 in. and heavier	3.76c.
*Structural shapes	3.75c.
*Soft steel bars, round	3.84c.
Iron bars, Swed. char-coal	9.50c.
**Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
*Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.58c.
**Galv. sheets (24 ga.)	5.23c.
Long ternes (24 ga.)	5.90c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
*Floor plate, 1/4 in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed	4.85c.
Wire, galv. (No. 9)	4.70c.
O. H. spring steel, flats	4.70c.
Common wire nails, per keg	3.50c.

* For lots 400 to 1999 lb.
** For lots less than 1500 lb.

CHICAGO

Base per Lb.	
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.85c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

Base per Lb.	
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Cold-fin. bars (1500 lb. over)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.72c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.75
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.
Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lbs. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 400 to 1499 lb.

ST. LOUIS

Base per Lb.	
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

Base per Lb.	
Structural shapes, 3 in. and larger	3.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Base per Lb.	
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.15c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 3 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.70c.
Bands and hoops	3.82c.

NEW ORLEANS

Base per Lb.	
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Roller rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works	
Super-duty brick, at St. Louis	\$60.30
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.30
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (East-ern)	8.55

Chrome Brick

Net per Ton	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.90

Magnesite Brick

Net per Ton	
Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

Net per Ton	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.90
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

Base per Lb.	
*Plates, 1/4-in. and heavier	3.55c.
*Structural shapes	3.55c.
*Soft steel bars small shapes, iron bars (except bands)	3.35c.
Reinforce. steel bars, square and deformed	2.76c.
Cold-finished steel bars	4.16c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	3.85c.
*Spring steel	5.00c.
*Hot-rolled anneal. sheets	3.55c.
†Galvanized sheets (No. 24)	4.93c.
*Diam. pat. floor plates, 1/4 in.	5.25c.

*For quantities between 400 and 1999 lb.
†For 10 bundles or over.
‡For one to five tons.

BIRMINGHAM

Base per Lb.	
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
or more	
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and car-riage bolts	.50 & 10 off list
Rivets (structural)	\$4.60 base
On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.	

PACIFIC COAST

Base per Lb.			
	San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.40c.
Shapes, standard	4.00c.	3.80c.	3.50c.
Soft steel bars	4.00c.	3.95c.	4.00c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.525c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.75c.	4.00c.	3.70c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.00c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.00c.	4.75c.
Cold-finished steel			
Rounds	6.80c.	6.60c.	7.10c.
Squares and hexagons	8.05c.	7.85c.	7.10c.
Flats	8.55c.	8.35c.	8.10c.
Common wire nails—base per kegless carload	3.25c.	3.25c.	3.15c.

All items subject to differentials for quantity.

ST. PAUL

Base per Lb.	
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

Base per Lb.	
Soft steel bars	3.33c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.53c.
Hot-rolled strip, under No. 12	3.68c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.
*Price applies only in metropolitan Detroit.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Selling quieter in most sections, except in the East where all-time records are being broken ... Deliveries still becoming extended ... Foreign buying, lagging behind domestic orders, expected to spurt following amendment of Neutrality Act.

Increase in Foreign Ordering Expected By Cincinnati Makers

CINCINNATI—While the machinery demand in the Cincinnati area tends quieter, manufacturers are making no complaint over the present ordering. Although the domestic business still holds a very definite edge over foreign ordering, several substantial orders from French, English and Russian sources are reported to be pending. Grinder and milling machine demand continues to be definitely most active; lathe ordering was a trifle quieter during the past week. Heavy tools are in fairly brisk demand and drilling machinery is moving into high gear. Deliveries continue to become more extended. Most extended promises reach into the second quarter of next year. Production is equaling the theoretical capacity although in some instances manufacturers report that broader night forces would be possible were labor available.

Sales in the East Much Higher Than Elsewhere Proportionately

NEW YORK—There can be little doubt that sales in the East since the outbreak of hostilities in Europe in early September have been much higher proportionately than in other sections of the country. All-time sales records are being broken here. In two months' time some dealers have done more than a normal year's business and the end is not in sight. In a market where one to two radial drills a week have been average for the representative dealers, over a hundred such machine tools have been sold in a single week—in batches of 25 to 30, in place of the usual single lots. Much of this business is of a military nature. Aircraft engine manufacturers have been buying in tremendous volume with the object of increasing production, perhaps twofold. And there is no slackening in the pace of buying on the part of the Navy yards and the arsenals, particularly the latter. Springfield arsenal alone placed 96 milling machines in one award. Some very large and expensive machinery is being quoted to other arsenals at the present time. Millions of dollars of business await completion of tooling design details for the issuance of formal orders. Many machinery builders are buying equipment for those departments busy on Government contracts for the War or Navy Departments, but a fair amount of general industrial buying is also reported.

Greater activity in foreign buying is

expected under the revised Neutrality Act. For several weeks there have been in New York representatives of the French Air Ministry and the Munitions Ministry, and the setting up of a British buying agency is foreseen. The Brazilian Navy is in the market for shell making machinery. Russian buying continues at an even pace.

New England Machine Makers Operating at Peak

BOSTON—With improved manufacturing facilities, New England machine tool builders are doing more business than at any time since World War days. Backlog orders are sufficiently large to insure current operations well into 1940. In fact, delivery dates on certain types of machines are extended as far as October, 1940. Certain tool builders are operating foundries nights as well as days.

Demand for small tools also is extremely heavy, and certain New England makers are hard pushed to keep up with orders. In addition to the domestic delivery demand, England is placing substantial orders in New England. One order just placed was for \$26,000 worth of one type of twist drill, which with other tools made the individual order more than \$50,000.

Occasional Prompt Deliveries Still Being Quoted

CHICAGO—A few reports have been heard this week which serve to temper somewhat the almost hysterical delivery situation that this paragraph has reflected over the past several weeks. In one case, a shaper deal that has been on the fire for nearly two years is just now coming to a head, and a large well-known Cincinnati builder has offered immediate shipment out of stock. In another instance, a Chicago buyer was quoted a delivery of six weeks on standard drilling machines by a prominent manufacturer.

On the other hand, it still is true that many plants are booked to capacity for many months ahead. The above examples are undoubtedly in the minority today, but nevertheless they do exist, contrary to impressions previously given in this weekly comment. Chicago sales agencies representing Eastern plants are adversely affected as concerns deliveries because of the great demand in the East from industries with war orders, such as aircraft manufacturers. That Federal pressure is being exerted on machine tool builders for rapid action on orders from

the various airplane and parts makers is no secret.

Very little war business has come, or is expected, in the Chicago district. With the repeal of the arms embargo, however, indirect repercussions surely will be felt.

Final figures on October machine tool activity reveal improvements over September generally, with one office reporting the best month in its history. Small tool orders increased about 30 per cent over September. Distribution both as to customers and types of machines was widespread.

Buying Still Brisk But Pace More Deliberate

CLEVELAND—November has started off well from the sales standpoint in this district, although the pace is more deliberate than a month ago. The calmer tone is welcomed by most sellers and producers, some of whom report October bookings were among the heaviest in years. How much speculative business is on order books remains an open question, which probably won't be settled satisfactorily unless the war ends suddenly. A few industries, notably the automotive field, appear to have done more replacement buying than anything else. Mindful that the present market contains certain potential dangers, local sellers have become increasingly cautious recently and have actually rejected some business which appears tinged with speculation.

Aircraft parts suppliers have been buying machine tools steadily. The volume has been gratifying from electrical companies such as Westinghouse at Cleveland and Mansfield and General Electric here. The latter company's transfer of one department from Warren, Ohio, is resulting in quite a bit of new precision equipment. A motor truck manufacturer has a large list outstanding, and scattered inquiries have arisen from diversified fields, including the business machine industry. Jig borers are in good demand.

Heavy demand for millers, horizontal boring mills and large turret lathes continues to feature the used machinery market and planers are beginning to open up. Foreign demand continues strong.

Manufacture of Engines for Export May Rise in Detroit

DETROIT—Changes in the national embargo provisions have already led to some developments in the Detroit area. The most important of these is understood to be the revival of a program for foreign engine manufacture. Sponsorship of the project has not yet been revealed. The work is showing an increase with many miscellaneous industries contributing to the demand.

New Fretz-Moon Pipe Mill for Wheeling

The Wheeling Steel Corp. has purchased a Fretz-Moon continuous butt-weld pipe mill from the Salem Engineering Co., Salem, Ohio. Construction is to start immediately and the new mill will be located at Wheeling's Benwood, W. Va., plant.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Universal Atlas Cement Co., Hudson, N. Y., has let general contract to James Stewart & Co., 230 Park Avenue, New York, for one-story addition for storage and distribution. Cost over \$65,000 with equipment. Main offices are at 208 South LaSalle Street, Chicago.

General Chemical Co., 40 Rector Street, New York, industrial chemical, has acquired former No. 2 plant of Henderson-Ames Co., Kalamazoo, Mich., consisting of tract, 275 x 350 ft., with main two-story mill, 60 x 120 ft., and several smaller structures, and will modernize for new branch plant.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Nov. 14 for gages (Circular 207); until Nov. 21, four drilling machines (Circular 203).

Forged Metal Carbide Corp., Long Island City, New York, hard metal alloys, has leased one-story industrial building at 40-30 Twenty-third Street, for plant.

Union Bag & Paper Corp., Woolworth Building, New York, has approved plans for two-story addition to branch mill at Hudson Falls, N. Y., 100 x 125 ft., for expansion in processing and converting divisions. Award for excavations has been made to Kingsbury Construction Co., Hudson Falls.

Signal Corps Procurement District, Army Base, Fifth-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 17 for mast bases, capacitors, transformers, coils, relays, rheostats, etc. (Circular 125); until Nov. 23 for battery sets, test oscillators, etc. (Circular 136); until Nov. 21, generators and spare parts (Circular 131).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 17 for two motor-driven milling machines (Schedule 7667) for Brooklyn Navy Yard; until Nov. 14, transformers for Brooklyn and Philadelphia yards (Schedule 7651), three motor-driven oxygen transfer equipments for Philadelphia and San Diego yards (Schedule 7654).

Spencer-Larsen Aircraft Corp., Amityville, L. I., has arranged for merger with Long Island Aircraft Corp., Lindenhurst, L. I., aircraft for Coast Guard service and similar planes. First noted company has acquired one-story plant at Amityville, formerly occupied as a seaplane base by Fairchild Airplane Mfg. Co., and will remodel for production of metal aircraft for commercial use, as well as amphibians and seaplanes, including parts manufacture and assembling. Consolidated company will concentrate production at latter location in future.

Dorr Co., Inc., 570 Lexington Avenue, New York, machinery and equipment for chemical and mining industries, has asked bids on general contract for one-story addition to plant, at Westport, Conn., 80 x 170 ft., and office building adjoining. Cost about \$75,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 13 for seamless steel tubing (Circular 697), 1785 gross of commercial brass screws (Circular 609), one set of steel pins, 0.01 in. to 0.085 in. in steps of 0.001 in. (Circular 623); until Nov. 14, 4100 couplings and 4600 suspension lugs (small steel forgings) (Circular 603), one high-speed precision lathe (Circular 599), one hardening furnace with controlled atmosphere (Circular 597), sinker nails (Circular 604), one precision bench lathe, 7 x 16 in. (Circular 598); until Nov. 15, one superficial hardness tester (Circular 619), 33,500 internal gears, 33,500 external gears, 67,000 eccentric drive gears, and 33,500 drive gears (Circular 531), 2400 units of point detonating fuses (Circular 537), one tool room precision lathe (Circular 610); until Nov. 16 for one bench lathe with all attachments (Circular 624).

Lionel Corp., 28 Saeger Place, Irvington, N. J., manufacturer of electric toy trains, and other electrical and mechanical toys, has let general contract to M. C. Engineering Corp., Irvington, for one-story addition, 200 x 400 ft. Cost close to \$100,000 with equipment. Daniel J. Scrocco, 210 Tremont Avenue, Orange, N. J., is architect.

Commanding Officer, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, asks bids until Nov. 14 for gages for point detonating fuse (Circular 563); until Nov. 15, one electro-limit gaging machine (Circular 619), eight drill presses and two drilling and tapping machines (Circular 594).

Walter Kidde & Co., Bloomfield, N. J., carbide dioxide fire extinguishing equipment, are erecting a new building, 20,000 sq. ft. of floor space, at West and Race Streets, exclusively for engineering and research work.

◀ BUFFALO DISTRICT ▶

Gleason Works, Inc., 1000 University Avenue, Rochester, N. Y., gear-cutting machinery and parts, cut gears, etc., has let general contract to Alexander, Shumway & Utz Co., 80 South Fitzhugh Street, for one-story addition, 95 x 160 ft. Cost over \$75,000 with equipment.

Central New York Power Corp., 300 Erie Boulevard West, Syracuse, N. Y., affiliated with Niagara Hudson Power Corp., Buffalo, has plans for doubling capacity of new steam-electric generating plant now in course of construction at Oswego, N. Y., and will install a second 80,000-kw. turbine-generator unit and accessories, high-pressure boilers and auxiliary equipment. Cost of present unit under way is estimated at \$9,500,000, with completion scheduled next spring, and new extension, to be completed early in fall of 1941, will cost about \$7,000,000 additional. Company also plans new one-story equipment service and repair building, including garage for company motor trucks, machine shop, etc., at Fulton, N. Y. Cost over \$75,000 with equipment. Melvin L. and Harry A. King, Denison Building, Syracuse, are architects for last noted structure.

◀ NEW ENGLAND ▶

G. E. Prentice Mfg. Co., New Britain Road, Kensington, New Britain, Conn., manufacturer of metal slide fasteners, sheet metal and wire specialties, etc., plans three-story addition, 40 x 97 ft. Cost close to \$50,000 with equipment.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Nov. 13 for one broaching machine lathe (Circular 195).

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 13 for one broaching machine (Circular 131), one surface grinder (Circular 132); until Jan. 16, for 1675 automatic pistols, three sets of gages, three sets of jigs, fixtures and patterns for pistols, three sets of punches and dies, three sets of machine and other processing equipment (Circular 126).

Bancroft Steel Corp., 62 Lincoln Street, Worcester, Mass., has let general contract to Austin Co., Cleveland, and 19 Rector Street, New York, for one-story addition, 65 x 100 ft., and improvements in present plant. Cost over \$40,000 with equipment.

Waterbury Tool Co., 188 Aurora Street, Waterbury, Conn., has started erection of a one-story, machine shop, 72 x 106 ft., to cost

\$25,000 without equipment. Austin Co., Cleveland, and 19 Rector Street, New York, is contractor.

◀ WASHINGTON DIST. ▶

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until Nov. 14 for 36 3-ton mine cars (Circular 44); until Nov. 16, five rolling steel doors, 9½ x 15 ft., and one similar door, 8 x 8 ft. (Circular 45), all for Brooklyn.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 13 for one motor-driven tool-grinder, 36 steel snatch blocks (Schedule 3700), wire rope, phosphor-bronze tiller rope, soft steel wire, phosphor-bronze wire, seamless brass pipe, seamless steel tubing, etc. (Schedule 3694), 72 steel ratchet pipe diestocks, 72 sets of pipe diestocks, two oil purifiers, steel couplings (Schedule 3617), manhole frames and covers (Schedule 3719); until Nov. 14, 96 pipe vises (Schedule 3720); until Nov. 17, 90,000 ft. of copper wire cloth, 27,000 ft. of steel wire cloth, 20,000 ft. of galvanized steel wide poultry netting (Schedule 3707).

Municipal Airport Department, Airport, Municipal Logan Field, Dundalk, Baltimore, has secured approval of Civil Aeronautics Authority, Washington, for new hangar unit, with shop and repair facilities, for which fund of \$191,703 has been secured through Federal aid, and for other work and improvements at airport to cost about \$600,000, for which appropriation similarly has been obtained.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 14 for one motor-driven upsetting-forging machine (Schedule 7663) for Boston Navy Yard; one complete motor-generator set (Schedule 7656), one motor-driven metal shrinker or upsetter (Schedule 7655), one motor-driven, vertical, automatic testing machine for testing safety belts, etc. (Schedule 7660), steel sockets for Morse taper shank tools (Schedule 7624), one box radiant-type electric furnace, and one tool room box-type electric furnace (Schedule 7659) for Eastern or Western yards.

◀ SOUTH ATLANTIC ▶

South Carolina Public Service Authority, Charleston, S. C., asks bids until Nov. 28 for two 100-ton electric traveling cranes, one 45-ton gantry for intake at hydroelectric power development, one 35-ton gantry crane for draft tube at power plant, two 20-ton gantry cranes for spillway at power plant, one spillway multiple gate hoist, four sets of lock gate machinery, four sets of lock valve machinery, two towing units, all for Pinopolis power dam and generating station, about 32 miles from Charleston. Also at same time for lower arch lock gate of two leaves, each 245 tons; upper lock girder gate, two leaves, each about 140 tons; two wheel head gates and six sets of guides, each about 50 tons; four sliding head gates and 10 sets of guides, each 40 tons; two sliding tail gates and 10 sets of guides, each 30 tons; two sliding tail gates and two sets of guides, each seven tons; 96 sections of intake trashrack, total about 330 tons, all for power development noted, and Santee spillway dam, approximately 18 miles from Pinopolis. Harza Engineering Co., 27 Cumberland Street, Charleston, is consulting engineer.

◀ SOUTH CENTRAL ▶

Board of City Commissioners, Gulfport, Miss., has let general contract to Pittman Brothers Construction Co., 2803 North Galvez Street, New Orleans, for one-story addition to municipal warehouse on waterfront, consisting of five sections, each 160 x 120 ft., with three loading tracks, at \$289,954. Installation will include loaders, conveyors and other mechanical-handling equipment. Shrouds & Bean, Gulfport, are architects and engineers.

R. C. Tway Coal Co., Harlan, Ky., plans rebuilding tippie at coal-mining plant on Martins Fork Highway, recently destroyed by fire. Loss close to \$60,000 with equipment.

Mississippi River Commission, Vicksburg,

Miss., asks bids until Nov. 20 for one wood planer, with electric drive (Circular 26).

Lone Star Cement Corp., Shell Building, Houston, Tex., has let contract to Tellepsen Construction Co., 3900 Clay Street, for one-story storage and distributing plant at Manchester, Tenn., to include hopper unit, derrick and other mechanical facilities. Cost about \$125,000 with equipment.

◀ SOUTHWEST ▶

American Packing Co., 3842 Garfield Avenue, St. Louis, meat packer, has let general contract to Woermann Construction Co., 3800 West Pine Boulevard, for one and two-story addition, 50 x 165 ft. Cost over \$75,000 with equipment. Henschien, Everts & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Williams Roofing Co., Waterloo, Ark., roofing products, plans rebuilding part of plant recently destroyed by fire. Loss over \$100,000 with equipment.

Dart Truck Co., 2648 Oak Street, Kansas City, Mo., motor trucks, trailers and parts, has approved plans for one and two-story addition, 100 x 132 ft., and will proceed with erection by separate contracts for different branches of work. Cost close to \$80,000 with equipment. Robert R. Raney, Union Station Building, is architect.

Mid-Continent Supply Co., 3130 Navigation Boulevard, Houston, Tex., oil well equipment and supplies, has let general contract to B. & M. Construction Co., 3715 Graustark Street, for one and two-story addition, 60 x 200 ft. and 31 x 75 ft., for storage and distribution. Cost close to \$85,000 with equipment.

Corpus Christi Corp., Corpus Christi, Tex., W. A. Warren, president, plans new gas recycling plant in Stratton oil field, Nueces County, Tex., where company has recently acquired about 6000 acres of oil-producing properties. It will consist of several units, with compressor station to process about 50,000,000 cu. ft. of natural gas daily. Cost over \$175,000 with machinery.

August Balter Mfg. Co., 209 South Main Street, St. Louis, automobile bodies and parts, has started erection of a two-story factory at 940 Chouteau Avenue, to contain 12,900 sq. ft. of floor space. Cost about \$45,000 with equipment.

◀ WESTERN PA. DIST. ▶

Erie Forge & Steel Co., West Sixteenth Street, Erie, Pa., steel forgings, steel castings, etc., has let general contract to Erie Steel Construction Co., Geist Road, for one-story addition, 50 x 120 ft., for expansion in steel treating division and other departments. Cost over \$60,000 with equipment.

Republic Oil Co., Benedum Trees Building, Pittsburgh, has let general contract to G. A. Miller Co., Inc., 312 Twigg Street, Tampa, Fla., for new bulk oil storage and distributing plant on east side of Estuary, Tampa, with steel tank storage units, pumping station and other facilities. Cost about \$75,000 with equipment.

McKenna Brass & Mfg. Co., Millersburg, Pa., brass, copper and allied metal products, is organizing Joseph Reid Gas Engine Corp., a subsidiary, to take over Joseph Reid Gas Engine Co., Oil City, Pa., recently acquired, and will continue plant at present location. Reid company has been in receivership for several months.

◀ OHIO AND INDIANA ▶

Tool Steel Gear & Pinion Co., Township Avenue, Elmwood, Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story addition. Cost close to \$40,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects.

Hydraulic Equipment Co., 1100 East 222nd Street, Cleveland, hydraulic control devices, parts, etc., has let general contract to Peck & Udell Construction Co., 2341 Carnegie Avenue, for one-story addition, 60 x 75 ft. Cost about \$45,000 with equipment.

Cleveland Graphite Bronze Co., 880 East

Seventy-second Street, Cleveland, will proceed with superstructure for one-story plant unit, 80 x 200 ft., at 16800 St. Clair Avenue, for which general contract has been let to A. M. Higley Co., 2036 East Twenty-second Street. Cost over \$75,000 with equipment. John H. Graham, Hanna Building, is architect.

Ohio Farm Bureau Cooperative Association, Inc., 246 North High Street, Columbus, Ohio, plans five new commercial fertilizer-manufacturing plants in different localities, each comprising several one-story units for general production, storage and distribution, power house and other service. Entire project will cost close to \$500,000 with equipment. Site for initial plant is being secured near Marietta, Ohio. William W. Carlton, 1816 Central Parkway, Cincinnati, is engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 13 for calipers, combination sets, gages, steel joint dividers and other precision tools (Circular 489), 3050 cape chisels and 5394 cold flat chisels (Circular 494), spray paint guns (Circular 493), 50 target assemblies (Circular 485); until Nov. 14, machinist's hammers and 1066 brass hammers (Circular 502), brass welding rods and copper tubing (Circular 500); until Nov. 15, one motor-driven floor-type drill (Circular 513), steel tape armored parkway cable and lead-covered rubber-insulated cable (Circular 512).

Board of Public Works, Fort Wayne, Ind., asks bids until Nov. 28 for one 15,000-kw. turbo-generator unit and auxiliary equipment and one surface condenser for installation in municipal electric power plant, where expansion and improvements will be made. Bids for other equipment will be asked later. Entire project will cost about \$560,000.

◀ MICHIGAN DISTRICT ▶

Stinson Aircraft Division, Aviation Mfg. Co., Wayne, Mich., airplanes and parts, has let general contract to Thompson-Schmidt Co., 6209 Sixteenth Street, Detroit, for one-story addition. Cost over \$75,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Howard Flint Ink Co., 2546 Clark Street, Detroit, printing and other inks, will ask bids soon on new one-story plant, 120 x 280 ft., on 23-acre tract on Lockwood Drive, Houston, Tex. Cost close to \$100,000 with equipment. New plant will replace present factory at 1 Hamilton Street, Houston. Harley & Ellington, Stroh Building, Detroit, are architects; David M. Duller, Second National Bank Building, Houston, is consulting engineer.

◀ MIDDLE WEST ▶

International Rolling Mill Products Co., 3136 West Fifty-first Street, Chicago, steel products, has let general contract to Peter Kalinak, 2744 West Fifty-first Street, for new one-story plant, 176 x 324 ft., at 5031-43 South Kedzie Avenue, for storage and distribution. Cost over \$80,000 with equipment. Rawson & Eisenberg, 4930 West Adams Street, are architects.

Nottingham Steel Co., 7450 South Ashland Avenue, Chicago, steel specialties, has let general contract to Enjay Construction Co., 160 North LaSalle Street, for one-story plant at Thirty-fourth Street and Justine Avenue. Cost over \$40,000 with equipment. Howard Colburn, 160 North LaSalle Street, is architect.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Nov. 13 for one hobbing machine, spur and spiral gears and spline shafts (Circular 335), 18 steel die blocks (Circular 336), one trimming press for 2000-lb. drop hammer (Circular 337), 36 rifling heads and 1000 tools (Circular 338).

Joseph Dingle Boat Works, 596 Texas Street, St. Paul, Minn., has let general contract to Builders Co., Guardian Building, for one-story shop addition, 78 x 81 ft., at boat-building and repair works foot of Wisconsin Street. Cost close to \$40,000 with equipment. Ellerbe & Co., First National Bank Building, are architects.

Oscar Mayer & Co., 1241 North Sedgwick Street, Chicago, meat packers, have let general contract to Fritz Construction Co., 138 North Frances Street, Madison, Wis., for one-story and basement addition, 100 x 220 ft., to branch packing plant at Madison. Cost over \$65,000 with equipment. This is part of expansion under way at same plant, including a five-story and basement addition, 50 x 75 ft., to cost about \$60,000, for which general contract recently was let to J. H. Findorff & Son, 601 West Wilson Street, Madison. Henschien, Everts & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

United States Engineer Office, Federal Building, Milwaukee, asks bids until Nov. 13 for six steel valve frames and valves for timber lock gates, six operating lever mechanisms, six forged steel valve rods, six forged steel shackle bars, 30 forged steel rod guides, four forged steel adjustable eye bats, 12 steel connection plates, 14 wrought iron shackle bar bolts, four drop forged steel turnbuckles, steel plate washers, tie rods, etc. (Circular 109).

◀ PACIFIC COAST ▶

Douglas Aircraft Corp., Santa Monica, Cal., cabin planes and other aircraft and parts, has let general contract to MacIsaac & Menke, 3445 Union Pacific Avenue, Los Angeles, for one-story addition, 200 x 250 ft., with mezzanine floor, 50 x 250 ft., for expansion in press department and other production divisions. Cost over \$125,000 with equipment. Contract also has been let to Alco Construction Co., 1113 North Sycamore Avenue, Los Angeles, for mezzanine floor in existing shop unit. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architect and engineer respectively.

Commanding Officer, Ordnance Department, Benicia Arsenal, Benicia, Cal., asks bids until Nov. 22 for one 6-in. vertical shaper, with motor-drive, attachments and accessories (Circular 26).

Orange Fruit Belt Distributors, Inc., Pomona, Cal., has leased two-story and basement building, 60 x 135 ft., to be erected on local site by Las Vegas Land & Water Co., for new packing plant. Erection contract has been let to Hanawalt Brothers, 2151 D Street, La Verne, Cal. Cost close to \$45,000 with conveying, loading and other mechanical-handling equipment.

Bureau of Reclamation, Denver, asks bids until Nov. 27 for one vertical shaft 7000-hp. hydraulic turbine; actuator-type governor with pumping equipment for turbine noted; 6000-kva. electric generating unit, with accessories; transformers, switches and auxiliary equipment, all for installation in Minidoka hydroelectric power plant, Minidoka project, Idaho (Specifications 881).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 17 for precision bench lathes (Schedule 7644), two engine lathes (Schedules 7631 and 7642), one tool room lathe (Schedule 7643) for San Pedro naval air station, Los Angeles; one milling machine (Schedule 7640) for Seattle yard, all motor-driven; ventilation equipment with motors, controllers and spare parts (Schedule 7650), heat and flame resistant electric cable (Schedule 7646) for Mare Island Navy Yard.

◀ FOREIGN ▶

State Electricity Commission, Melbourne, Victoria, Australia, asks bids until Dec. 12 for waterwheel-driven turbo-generator units and auxiliary hydroelectric power plant equipment (Specifications No. 39-40/11).

Canadian Titanium Pigments, Ltd., 1135 Beaver Hall Hill, Montreal, has let general contract to Fraser-Brace Engineering Co., Ltd., 107 Craig Street, for new one-story plant at Cap de la Madeleine, Que. Cost close to \$225,000 with equipment.

Rolland Paper Co., Ltd., 116 St. Paul Street West, Montreal, writing paper stocks, has approved plans for one and multi-story addition to mill at St. Jerome, Que., to increase present capacity about 25 per cent, including new paper-making machine and auxiliary equipment. Cost over \$200,000 with machinery.

PRODUCTS INDEX

JUST BETWEEN US TWO

CHEMICALS—Industrial
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Alroese Chemical Co., Cranston, Providence, R. I.
Parker Rust Proof Co., 2186 Milwaukee Ave., Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHROMIUM — Plating — See Plating — Chromium

CHRONOGRAPHS
Stillman, M. J., Co., Inc., Chicago.

CHUCKING MACHINES—Automatic
New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.
Potter & Johnston Machine Co., Pawtucket, R. I.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

CHUCKS—Magnetic
Brown & Sharpe Mfg. Co., Providence, R. I.
Heald Machine Co., Worcester, Mass.
Taft-Peiree Mfg. Co., The, Woonsocket, R. I.

CLAMPS—Cable Strain
Efficiency Electric & Mfg. Co., East Palestine, Ohio.

CLAMPS—Rail Booster
Efficiency Electric & Mfg. Co., East Palestine, Ohio.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Ford, J. B., Sales Co., The, Wyandotte, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING COMPOUNDS—Alkali
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT (METAL)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLUTCH-BRAKES—Magnetic
Kiekhaefer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Falls Clutch & Mch. Co., The, Cuyahoga Falls, Ohio.

FOOTE Bros. Gear & Machine Co., 5301-H So. Western Blvd., Chicago, Ill.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, N. Y.

CLUTCHES—Friction
Dodge Mfg. Corp., Mishawaka, Ind.
Twin Disc Clutch Co., Racine, Wis.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 727 Smith St., Milwaukee.
Kiekhaefer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Koppers Coal Co., The, Pittsburgh.
Pickands Mather & Co., Cleveland.
Sejuzuglepport, Kallavskaja Ulitza 5, Moscow 6, U. S. S. R.

COAL ORE & ASH HANDLING MACHINERY
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Engineering & Construction Div., Pittsburgh.

COLD ROLL FORMING MACHINES
McKay Machine Co., The, Youngstown, Ohio.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

COMBUSTION CONTROLS
Brown Instrument Co., The, Philadelphia.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

Morgan Construction Co., Worcester, Mass.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

CONDENSERS—Surface & Jet
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDENSERS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLLERS—Crane
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLS—Time Cycle
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

CONVEYING AND ELEVATING MACHINERY
Farquhar, A. B., Co., Ltd., York, Pa.
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramway Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.

COPING MACHINES
Cleveland (Ohio) Punch & Shear Works Co., The.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Penola, Inc., Pittsburgh.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS—See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D. Spring Co., 749 Central Ave., Pontiac, Mich.

COUNTERBORES
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
Cleveland (Ohio) Twist Drill Co., The.
Gairing Tool Co., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Streeter-Ames Co., Chicago.
Veeder-Root, Inc., Hartford, Ct.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Cut-Off Friction
Foote Bros. Gear & Machine Co., 5301-H So. Western Blvd., Chicago, Ill.

COUPLINGS—Flexible
Crocker-Wheeler Electric Mfg. Co., Amherst, N. Y.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

COUPLINGS—Pipe
Champion Machine & Forging Co., The, Cleveland, Ohio.
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
American Hoist & Derrick Co., St. Paul, Minn.
Cullen-Friedstedt Co., 1303 S. Kilbourn Ave., Chicago.

Plug

The 33,000 who milled through the ample aisles of Chicago's International Amphitheatre are safely returned to their firesides, and the 21st National Metal Exposition is history.

New highs were established in the measurable factors, and also, it seems to us, in the immeasurable one of display value. It used to be that a tour of trade exhibits was something to be approached as a grim duty, like cleaning the cellar. But so great have been the strides made in the past several years that making the rounds of the booths is now something to be looked forward to with pleasure, even with enthusiasm—if that handsome blonde innovation of Lindberg Engineering's becomes a trend.

Suggestion

To our lay eye the Exposition approached perfection. Our only recommendation is that before assigning booth locations each year each exhibitor be required to give an advance performance before a sound recorder, to measure noise in decibels.

A certain decibel standard should be established, and all those exhibits whose sound-producing effects are effective beyond a range of say 35 ft. should be placed in one part of the hall, and all the others grouped in a bedlam section.

This would be an improvement over the present practice of scattering the noise makers and allowing them to dominate quiet areas, like a cricket in a cathedral. Single, sustained noises are maddening, but a concert of noises creates a symphonic effect.

Raucous Rooster

The booth opposite ours had an artificial rooster hooked up to an amplified phonograph record. The novelty soon wore off and after the first three days we took on the haggard look of the fellow in Poe's "The Raven," and crowed in our sleep.

Bloomer Twangs Memory's Chords

The items about bloomers moves Bill (Armco) McFee to reminiscence:

"Years ago when I was in the show business 'bloomers' was a plural noun meaning to play a series of relatively empty houses. The word was especially current in the outdoor branch of the show business and when applied too often spelled disaster."

Although becoming archaic, it is still slang for mistake or failure. What we would like to know is how that use originated.

Blackjacks With Shock Absorbers

Under Washington's able leadership, euphemism is rapidly becoming a fine art. A loss is a "negative gain." The next draft will be "selective service." Substitute a velvety synonym for an ugly word and you do away with mental distress.

"Expenses" is an ugly word. Better say "budget." In an article in the *Satevepost* months ago, before the war began needling business and prices, Wendell L. (Commonwealth & Southern) Willkie had occasion to remark that people wisely were buying nothing they could do without. But put in that bald fashion, the thought would not only have been unpleasant but heretical besides. So he phrased it:

"... and not add any unnecessary commitments to your budget."

Stoppers

*Ice by the yard from ribbons on rubber—Goodrich
Sorry—No Goose Grease—Shell*

Complaint About Nothing

Arthur E. Raab, head of the Michigan State Labor Mediations Board, expressed concern at the continued spectacle of 0,000 Michigan workmen out of employment.—*New York Herald-Tribune*

Some people are never satisfied.

Puzzles

Last week's river flowed 2 miles per hour.

Jack (Caterpillar Tractor) How and Charley (Hoskins Mfg.) Kinnison unscrambled offhandedly the sentence that sent Philetas to his death.

Sir Isaac Newton was fond of this one:

Three cows eat in two weeks all the grass on two acres of land, together with all the grass that grows there in the two weeks. Two cows eat in four weeks all the grass on two acres of land, together with all the grass that grows there in four weeks. How many cows, then, will eat in six weeks all the grass on six acres of land together with all the grass that grows there in the six weeks?

—A. H. D.

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ECONOMY

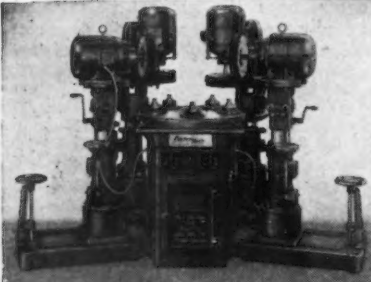
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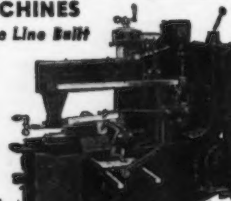
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PRODUCTS INDEX

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES—Electric, Industrial, Truck Mounted

Baker-Rauling Co., The, 2175 W. 25th St., Cleveland.

Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling

Armel, James P., Pittsburgh.

Cleveland Tramrail Div. of The Cleveland Crane & Engrng. Co., Wickliffe, Ohio.

Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Morgan Engineering Co., The, Alliance, O.

Northern Engineering Works, Detroit, Mich.

Robbins & Myers, Inc., Springfield, Ohio.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Whiting Corp., Harvey, Ill.

CRANES—Gantry

Dravo Corp., Engineering Wks. Div., Pittsburgh.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Morgan Engineering Co., The, Alliance, O.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Whiting Corp., Harvey, Ill.

CRANES—Hand Power

American Monorail Co., The, Cleveland.

Cleveland Tramrail Div. of The Cleveland Crane & Engrng. Co., Wickliffe, Ohio.

Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Northern Engineering Works, Detroit.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Whiting Corp., Harvey, Ill.

CRANES—Jib

American Monorail Co., The, Cleveland.

Euclid Crane & Hoist Co., The, Euclid, O.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Whiting Corp., Harvey, Ill.

CRANES—Locomotive

American Hoist & Derrick Co., St. Paul, Minn.

Cullen-Friedstedt Co., 1303 S. Kilbourn Ave., Chicago.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail

American Monorail Co., The, Cleveland.

Cleveland Tramrail Div. of The Cleveland Crane & Engrng. Co., Wickliffe, Ohio.

Euclid Crane & Hoist Co., The, Euclid, O.

Northern Engineering Works, Detroit.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable

Canton Pdry. & Mch. Co., Cleveland.

CRANES—Portable Electric

Baker-Rauling Co., The, 2175 W. 25th St., Cleveland.

Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Union Drawn Steel Div. Republic Steel Corp., Mazon, Ohio.

CRANKSHAFTS—Forged

Ray City Forge Co., Erie, Pa.

Kropf Forge Co., Chicago, Ill.

Midvale Co., The, Nicetown, Phila., Pa.

CRUSHERS—Coal

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CRUSHERS—Steel Turning

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUPOLA CHARGING EQUIPMENT

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

CUTTERS—Die Sinking

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Tomkins-Johnson Co., The, Jackson, Mich.

Fellows Gear Shaper Co., Springfield, Vt.

CUTTERS—Gear Shaping

Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

CUTTERS—Milling

Barber-Colman Co., Rockford, Ill.

Brown & Sharpe Mfg. Co., Providence, R. I.

Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

Cleveland (Ohio) Twist Drill Co., The, Morse Twist Drill & Mch. Co., New Bedford, Mass.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Victor Machinery Exchange, 251 Centre St., N. Y. C.

CUTTING-OFF MACHINES—Abrasives

Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw

Espen-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or Tubing

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Bardons & Oliver, Inc., Cleveland.

Cox & Sons Co., The, Bridgeton, N. J.

Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS

Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS—Compressed Air & Hydraulic

Hannlin Mfg. Co., Chicago.

Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless

Harrisburg (Pa.) Steel Corp.

Midvale Co., The, Nicetown, Phila., Pa.

National Tube Co., (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DESIGNING & DEVELOPING

Torrington (Conn.) Mfg. Co., The.

DIAMOND TOOLS

Bausch & Lomb Optical Co., Rochester, N. Y.

DICTATING MACHINES

Dictaphone Corp., 420 Lexington Ave., N. Y. C.

DIE BLOCKS—Drop Hammer

Heppenstall Co., Pittsburgh.

Kropf Forge Co., Chicago, Ill.

DIE CASTING MACHINES

Reed-Prentice Corp., Worcester, Mass.

DIE SINKING MACHINES—Automatic and Hand

Cincinnati (Ohio) Milling Mch. Co., The.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic

Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES, JIGS, FIXTURES, etc.

Barth Stamping & Mch. Wks., Cleveland.

Star Machine & Tool Co., Cleveland, Ohio.

Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

DIES—Cast Tool Steel

Advance Foundry Co., The, Dayton, Ohio.

Detroit (Mich.) Alloy Steel Co.

DIES—Drawing & Sizing

Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

DIES—Pipe Threading

Landis Mch. Co., Inc., Waynesboro, Pa.

National Acme Co., The, Cleveland.

DIES—Resistance Welding

Mallory, P. R., & Co., Inc., Indianapolis, Ind.

DIES—Screw and Thread Cutting

Eastern Mach. Screw Corp., New Haven, Ct.

Geometric Tool Co., The, New Haven, Conn.

Greenfield (Mass.) Tap & Die Corp.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

National Acme Co., The, Cleveland.

DIES—Self-Opening Adjustable

Eastern Mach. Screw Corp., New Haven, Ct.

Geometric Tool Co., The, New Haven, Conn.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

Murehey Machine & Tool Co., Detroit, Mich.

National Acme Co., The, Cleveland.

DIES—Sheet Metal Working

Cimatool Co., The, Dayton, Ohio.

Worcester (Mass.) Stamped Metal Co., 6 Hunt St.

DIES—Steel Letters and Stamps

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof

Kinner Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood Rolling

Kinner Mfg. Co., Columbus, Ohio.

DRAW BENCHES

McKay Machine Co., The, Youngstown, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL HEADS—Hydraulic

National Automatic Tool Co., Richmond, Ind.